

Mississippi Forestry Commission

Firewise Handbook



*Be Firewise Mississippi – Your
Home Doesn't Have To Burn*



Mississippi's Firewise Handbook



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Mississippi's Firewise Handbook

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Table of Contents

| | |
|---|----|
| Introduction | 1 |
| Are You Firewise?..... | 2 |
| Firewise: Inside And Out | 4 |
| Step 1: Develop And Maintain A Fire Safe Landscape Around Your Home..... | 4 |
| Step 2: Make Sure Emergency Personnel Can Locate And Get To Your Home | 5 |
| Step 3: Establish You Emergency Water Supply | 6 |
| Step 4: Build Or Remodel To Fire Safe Your House..... | 6 |
| Step 5: Fire Safety Inside Your Home | 7 |
| Step 6: What To Do When You Are Threatened By Wildfires..... | 8 |
| Think Twice Before You Do Any Outdoor Burning! | 10 |
| Create A 30 Foot Defensible Space Around Your Home..... | 11 |
| How To Make Your Home Firewise – Homeowner’s Checklist..... | 12 |
| How To Make Your Home Firewise – Homeowner’s Checklist (Spanish)..... | 15 |
| Firewise Landscaping Checklist..... | 18 |
| Firewise Construction Checklist..... | 19 |
| Quick Guide To Firewise Shrubs | 20 |
| The Ease Of Ignition Of 13 Landscape Mulches..... | 22 |
| 50 Firewise Things You Can Do ... To Protect Your Home | 27 |
| General Recommendations For Applying Herbicides To Forest Trees, Brush, And Woody Vines | 28 |
| National Fire Protection Association Forms | 37 |
| Standard For Protections Of Life And Property From Wildfire 2002 Edition | 38 |
| Structure Assessment Guide (2008 Edition) | 39 |
| Structure Assessment Rating Form (2008 Edition)..... | 41 |

INTRODUCTION

Firefighters in the wildland/urban interface (any area where wildland fuels threaten to ignite combustible homes and structures) must overcome severe challenges. There just aren't enough resources to protect every home threatened by wildfire. Everyone in the vicinity of such a fire is at risk, and the risk is greatly increased in areas that aren't prepared. A wildfire needs three things to exist: fuel, oxygen, and heat. Taken as a whole, these three elements form what is known as the fire triangle. If unprepared, your home might be the "fuel side" of the fire triangle.

Wildfires have been destroying homes since humans have inhabited flammable structures. The entire town of Peshtigo, Wisconsin burned in 1871, killing 1400 people the same day as the Great Chicago Fire. From 1920 to the mid- 1980's, the phenomenon was predominately a California story. It gained national attention in 1985 when 1,400 homes were lost nationwide and fire officials glimpsed the future: The return of fire to landscapes not previously thought of as fire-prone.

By 1986, a national initiative was underway, and supporters (mostly land management agencies) issued a landmark report called Wildfire Strikes Home, which was given to firefighters and homeowners and other stakeholders, such as landscapers and insurance agents. Interest in this report and its recommendations was great. Many homeowners didn't know that they didn't know about the dangers of a wildfire. From this humble beginning, an educational program known as Firewise was developed. The main goal of Firewise is to educate homeowners in the wildland urban interface on how to design, construct, landscape and maintain their homes and property to avoid destruction during a wildfire **without firefighting resources**.

Reducing the wildfire risk is not difficult. In fact, most Firewise modifications are easy and inexpensive.

- Create a survival zone around the house by reducing or eliminating vegetation at least 30 feet on all sides of the structure.
- Remove branches that overhang the roof, providing six to eight feet of clearance.
- Choose drought-resistant plants and don't use plants near your house that have resinous, oily, or waxy leaves.
- Select ignition-resistant building materials.
- Choose building sites away from slopes.
- Provide fire apparatus with safe and easy access to your property.

One fundamental Firewise principle is that a reduction of wildland fuel in the home ignition zone and the zone of defensible space will result in a reduction in wildland fire behavior. This manual has been prepared to assist homeowners with applying the basic Firewise principles of home design, construction, landscaping and maintenance to their property to follow that principle. It is designed especially to facilitate ease of handling and quick reference. Visit the national Firewise website at www.firewise.org, the National Fire Protection Association website at www.nfpa.org or the Mississippi Forestry Commission's website at www.mfc.ms.gov/firewise.htm for more tips on making your home and your community Firewise.

Mississippi has an expanding wildland urban interface and a substantial wildfire problem. The backbone of **your wildland** firefighting force is a partnership between the Mississippi Forestry Commission and your local paid or volunteer fire department. We need your help to protect your home.

Are You ?

Assess wildfire risk to your home with this questionnaire

Directions: Answer each question using assigned point values as it applies to your home. If the question does not apply, score it as a zero. Total points to get a value and determine the risk hazard for your home.

Entrance

1.
 - a. Mailbox or 9-1-1 address is clearly marked with 4-inch tall by 1/2 wide reflective letters. (0 pts) _____
 - b. Mailbox is clearly marked but difficult to read. (5 pts) _____
 - c. Address is not marked. (10 pts) _____
2.
 - a. Drive is at least 12 feet wide with 15 feet vertical clearance for emergency vehicles. If there is a gate, it is 30 feet from the road, 2 feet wider than the drive, opens inward, and has a key box if needed. (0 pts) _____
 - b. Drive is less than 12 feet wide and cleared of brush. (5 pts) _____
 - c. Drive is obstructed with no access for emergency vehicles. (10 pts) _____

House

3.
 - a. Home exterior has flame/heat resistant brick, stucco or metal. (0 pts) _____
 - b. Home has vinyl siding. (5 pts) _____
 - c. Home has wood or cedar shake siding. (10 pts) _____
4.
 - a. Roof consists of fire resistant materials such as tin, tile or asphalt shingles. (0 pts) _____
 - b. Roof has cedar shake shingles. (15 pts) _____
5.
 - a. Chimney has a spark arrestor and is capped. (0 pts) _____
 - b. Chimney is not capped. (5 pts) _____
6.
 - a. Gutters are cleaned of debris. Eaves are boxed. (0 pts) _____
 - b. Gutters are not cleaned. Eaves are boxed. (10 pts) _____
 - c. Gutters are not cleaned. Eaves are not boxed. (15 pts) _____
7.
 - a. Windows are double-pane, tempered glass. (0 pts) _____
 - b. Windows are single-pane. (5 pts) _____
8.
 - a. Attic vent is covered with 1/8-inch screened mesh. (0 pts) _____
 - b. Attic vent is not covered. (5 pts) _____

-
9. a. Deck is screened underneath with lattice and 1/8-inch screened mesh. (0 pts) _____
b. Deck is not screened. (10 pts) _____
10. a. Wood fencing or trellis is located 10 to 12 feet from the home or is non-combustible. (0 pts) _____
b. Wood fence or trellis is less than 10 feet from the house. (5 pts) _____

Landscaping

11. a. Property is landscaped with drought-resistant plants. Shrubs are at least 5 feet from structures. Gravel, compost or chunky bark is used as mulch. (0 pts) _____
b. Shrubs and other landscaping are less than 5 feet from the home. Flammable materials such as wood chips or grass have been used for mulch. (10 pts) _____
12. a. Overhanging limbs have been trimmed to 10 feet from structures. (0 pts) _____
b. Overhanging limbs are less than 10 feet from structures. (5 pts) _____

Perimeter

13. a. Home has 100 feet or more space cleared from the wildland-urban interface. (0 pts) _____
b. Home has 30 to 100 feet of defensible space. (3 pts) _____
c. Home has less than 30 feet of defensible space. (10 pts) _____
14. a. Firewood and propane gas tanks are at least 30 feet from structures. (0 pts) _____
b. Firewood is stacked near the house. LP tank is less than 30 feet from the home. (5 pts; 10 pts if gas tank is obstructed with overgrown bush) _____
15. a. Outbuildings are equipped with accessible rake, shovel, ladder and hose. (0 pts) _____
b. Outbuildings are not equipped with tools. (5 pts) _____

Total Score

Score Values:

- | | |
|--------------------|---|
| 11 points or fewer | Congratulations! You have a Firewise home |
| 12 – 30 points | Low to moderate hazard |
| 31 – 81 points | Moderate to high hazard |
| 82 – 125 points | High to extreme hazard means that the chances of your home surviving a wildfire are slim. Changes are needed. |



Firewise: *Inside and Out*

(Adapted from www.firesafecouncil.org)

Step 1: Develop And Maintain A Fire Safe Landscape Around Your Home

Your first defense against wildfire is to create a Firewise landscape around your home. This can be achieved by removing flammable vegetation and replacing it with fire-resistant plants; spacing the plants in your yard; and clearing away dead leaves on your roof and dry brush around your home.

Be sure to remove dead limbs overhanging your roof and any limb within 10 feet of your chimney. Also, remove pine needles, leaves and other debris from the roof of any structure on your property.

Defensible Space

If you are able to create a Firewise landscape at least 30 feet around your house (and out to 100 feet or more in some areas), you will reduce the chance of a wildfire spreading onto your property and burning through to your home. This is the basis for creating a "defensible space" — an area that will help protect your home and provide a safety zone for firefighters battling the flames.

Clearing all flammable vegetation a minimum of 30 feet around your home and other structures will provide you with the greatest chance for survival. But this does not mean you have to live with a ring of bare dirt around your home. You can create a defensible space and also beautify your property.

Fire Safe Landscaping

You can start with the native vegetation around your home. Many of the plants that grow naturally in your area are highly flammable during the summer, and can actually "fuel" a wildfire, causing it to spread rapidly through your neighborhood. Removing flammable native vegetation and replacing it with low-growing, fire-resistive plants is one of the easiest, and most effective, ways to create a defensible space.

You should select landscape vegetation based on fire resistance and ease of maintenance, as well as visual enhancement of your property. In general, fire resistant plants:

- Grow close to the ground;
- Have a low sap or resin content;
- Grow without accumulating dead branches, needles or leaves;
- Are easily maintained and pruned;
- And are drought-tolerant in some cases.

Some of the more common species of fire resistant plants are rosemary, African daisy, ice plant and periwinkle. Contact your local nursery to find out which plants are adaptable to the climate in your area. Stay away from unsafe ornamental landscaping plants such as junipers, which may actually increase the fire risk your home faces. If you have heavily wooded areas on your property, remove some of the trees to decrease the fire hazard and improve growing conditions.

Stack firewood and scrap woodpiles at least 30 feet from any structure.

Clear flammable vegetation for at least 10 feet around LPG tanks.

Other Firewise Precautions

After you have removed and/or replaced flammable native vegetation around your home for a minimum of 30 feet, there are other Firewise precautions you should follow.

- Vary the height of your landscape plants and give them adequate spacing. The taller your plants are, the wider apart they should be spaced.
- Remove dead limbs overhanging your roof and any limb within 10 feet of your chimney.
- Work with your neighbors to clear common areas between houses, and prune areas of heavy vegetation that are a threat to both.
- Avoid planting trees under or near electrical lines, where they may grow into or contact the lines under windy conditions, causing a fire.
- If you have a heavily wooded area on your property, remove some of the trees to decrease the fire hazard and improve growing conditions. Also, remove dead, weak or diseased trees and trees with an obvious lean, leaving a healthy mixture of older and younger trees.
- Properly dispose of all cut vegetation by an approved method. Open burning may require a burning permit. Contact your fire department for local requirements.
- Stack firewood and scrap woodpiles at least 30 feet from any structure. Clear away any

flammable vegetation within 10 feet of these woodpiles. Many homes have survived as a fire moved past, only to burn later from a wood pile that ignited after the firefighters moved on to protect other homes.

- It is recommended that you locate liquefied petroleum gas (LPG) tanks and any fuel storage containers at least 30 feet from any structure. Clear flammable vegetation at least 10 feet from around all such tanks.
- Clear pine needles, leaves and other debris from the roof of your house and any other buildings on your property.



- Check and clean your roof and gutters several times during the spring, summer and fall to remove debris that can easily ignite from a spark.

Remember that after you have established your Firewise landscape, you must maintain it regularly.

Step 2: Make Sure Emergency Personnel Can Locate And Get To Your Home

The first few minutes of a fire are the most critical for saving your home when threatened by wildfire. Fire fighting personnel must be able to immediately locate and safely travel to your home to have a chance to protect it.

Street signs and house addresses must be clearly posted, and roads must be able to accommodate busy traffic. At the same time fire engines and other emergency equipment are trying to drive into your area, you must be able to escape in your car with your family and valuable personal possessions.

Make sure your address is clearly posted on your house and at the entrance of your driveway. Remove pine needles, leaves or other debris from the roof of any structure on your property.

Street Signs and Addresses

Proper identification of your home is essential. Remember, during a major wildfire, firefighters from throughout the state arrive to assist local firefighters, and they will rely on clear street signs and addresses to find your home.

Your street name and address should be printed in letters and numbers that are at least four inches tall, on a contrasting color background. They should be visible from all directions of travel for at least 150 feet. The sign should also be made of fire resistant materials.

Each of the streets and roads in your area should be labeled, and each should have a different name or number. In addition, your home should have its own house number, which should be in numerical order along your street or road.



If your house is set back from the street or road, post your address at the entrance of your driveway. In situations where more than one home is accessed off a single driveway, all addresses should be posted at the street and at each appropriate intersection along that driveway.

Access to Your House

Even if your street and house are clearly identified for firefighters, precious time can be lost if firefighters have difficulty getting to your house. Narrow roads, dead-end streets, steep driveways and weak bridges can delay firefighters, or prevent them from arriving at all. Remember, fire-fighting equipment is much larger and heavier than your family car or truck.

Single lane roads or driveways should have turnouts with enough space to allow a fire engine and car to pass.

Roads, driveways and bridges should be built to carry at least 40,000 lbs., which is the average weight of a fire engine. (By comparison, the average family station wagon weighs about 4,000 lbs.) Also, streets and driveways must not be too steep or have sharp curves, which can prevent emergency equipment from arriving to protect your home.

Every dead-end street or long driveway should have an area large enough to allow fire engines to safely turn around.

Road and street systems must be planned and designed to provide safe emergency evacuation and fire department access. A minimum of two primary access roads should be designed into every subdivision and development.

All private and public streets should be designed and constructed to provide two traffic lanes, each a minimum of nine feet in width, which

is just enough space for a fire engine and car to pass each other. Curves and intersections should also be wide enough to allow large fire equipment easy passage and the ability to turn.

If you have any question about emergency access to your home, including construction widths, grades or strengths, contact your local fire department.

Additional Fire Safe Steps

Every dead-end street or long driveway should have a turnaround area designed as either a "T" or a circle large enough to allow fire equipment to turn around. Single-lane one-way roads and driveways should have turnouts constructed within sight of each other or at regular distances apart.

You can also improve your chances for safety by clearing away flammable vegetation at least 10 feet from all roads and at least five feet from driveways. If possible, cut back and prune vegetation even more than these distances, and make sure that trees and shrubs are widely spaced. Also, cut back any overhanging tree branches above the road. This will provide yourself, evacuating neighbors and arriving firefighters with even greater protection.

Each of these steps will give firefighters a chance to find and protect your home. A delay of only a few minutes can mean the difference between saving your home and losing it.

Step 3: Establish Your Emergency Water Supply

Even a Firewise house may not be able to survive a wildfire without an emergency water supply. Without an on-site water source, firefighters have very little chance of protecting a

threatened house or extinguishing a burning one.

A community water supply will provide firefighters with much needed water in an emergency. Swimming pools, tanks, streams and ponds are important emergency water sources that must be accessible to fire equipment.

Your Personal Emergency Water Supply

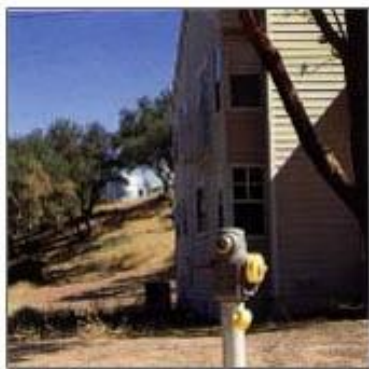
If you live in a home that is separated from others you may not have access to an adequate community water system. In this case, you will need to develop an individual well or water source that provides suitable storage and fire equipment access.

A minimum water storage supply of 2,500 gallons is recommended for use in emergency situations. A water supply of 2,500 gallons is roughly equal to the average above ground pool, 10 feet in diameter. Storage facilities may include above or below ground tanks, swimming pools, perennial streams or ponds.

Cooperation with your neighbors can result in the development of a common emergency water storage facility that can provide protection for your home and several others.

Access To Your Emergency Water Supply

Once you have established an emergency water supply, you must make sure firefighters can get to it. If your water comes from a well, it is



recommended that you have a gasoline-powered generator so firefighters can operate your pump during a power failure.

For any emergency water supply, the outlet valve must be easily seen and visibly signed from the nearest road. You can obtain specific outlet, valve design and thread requirements by contacting your local fire department

Step 4: Build or Remodel To Fire Safe Your House

Your house could be vulnerable to a wildfire because of its design, construction and location. If you are preparing to build, buy or remodel a house, you should know what to look for in a Firewise house. A few modifications to your construction plans can reduce the chance of your house catching fire, or resist further damage if it does catch fire. Don't let your house become another fuel for a wildfire.

If you are building a new house, locate it at least 30 feet from the boundary of your lot. This will allow you to design your landscape with at least 30 feet of **defensible space** around the house. Avoid ridge tops, canyons and areas between high points on a ridge. These are extremely hazardous locations for houses and firefighters because they become natural chimneys, increasing the intensity of the fire.

Building Materials

Exterior construction materials such as brick and stucco resist fire much better than wood. If you have a wood exterior, it is especially important that you follow the Firewise practices outlined in this booklet. Generally, thicker siding materials are more fire resistant.

Enclose the undersides of balconies and decks on slopes with fire resistive materials. If not enclosed, these

areas can trap flames and burning embers that can ignite your home.

Your Roof

Your roof is the most vulnerable part of your house because it can easily catch fire from the wind-blown sparks of a wildfire. Therefore, the single most important step you can take to create a Firewise house is to build or re-roof with fire resistive or noncombustible materials.



There are three classifications of fire resistive roofs: Class A offers the best protection; Class C is the minimum level required by law. Contact your local fire department for specific roofing guidelines in your area.

Other Building Concerns

Roof eaves extending beyond exterior walls are also susceptible to flame exposure, and should be limited in length, boxed or enclosed with fire resistive materials. Openings such as attic or ridge vents can allow easy entry of flaming embers and sparks. Cover all vents with a non-flammable 1/4-inch mesh screen.

Every chimney and stovepipe must be covered by a non-flammable screen with a mesh no larger than 1/2 inch.

Limit the size and number of window in your home that face large areas of vegetation. Even from a distance of 30 feet away, the heat from a wildfire may be enough to ignite the furnishings inside your house. Installing dual-paned windows and

sliding glass doors can reduce the potential of breakage from wind-blown debris and reduce the amount of heat transmitted from the fire to the interior of your home.

Step 5: Fire Safety Inside Your Home

Smoke detectors have saved many lives, and may save yours. More than 50 percent of fatal residential fires take place at night when people are sleeping. If a fire starts while your family is asleep, smoke detectors will wake you up. They can make the difference between life and death in a fire emergency.

Position smoke detectors on the ceiling just outside each bedroom. If you have a multi-level home, install a detector on every level. If you sleep with your bedroom door closed, place an additional detector inside your bedroom.

Before you buy a smoke detector, make sure it is listed and approved by an independent testing laboratory and the State Fire Marshal. Read the instructions enclosed with your smoke detector carefully to find out exactly how and where to install it. Be sure to test your smoke detector each month and change its batteries at least twice a year. A good habit to follow is to change the batteries in your smoke detector in the spring and fall when you change your clocks.

Portable Fire Extinguishers

Portable fire extinguishers can save lives and property by helping you put out or contain small fires until the fire department arrives. But they must be used properly and under the right conditions.

Be sure the fire extinguisher is listed and approved by an independent testing laboratory and the State Fire Marshal. Extinguishers are identified

by the type of fire on which they can be used:

- A - wood or cloth fires
- B - flammable liquid fires
- C - electrical fires
- D - flammable metal fires

Make sure that each member of your family can hold and operate the fire extinguisher and know where it is located. Mount extinguishers in easy-to-get-to places. Remember that fire extinguishers need annual maintenance and must be recharged after every use.

Home Sprinkler Systems

Home sprinkler systems are one of the most reliable and effective forms of protection from fire because they provide an immediate response to extinguish a fire inside your home. They also can extinguish a fire when you are asleep or when you are away.

Home sprinkler systems may pay for themselves in just a few years through reduced insurance premiums. Contact your local fire department for information on selecting an approved sprinkler system for your home.

Plan Your Escape!

It is important that all family members know what to do in an emergency. Even with an early warning from a smoke detector, escaping a fire can be difficult or impossible. Fire can spread very rapidly, blocking exits and creating dangerous, smoky conditions.

Smoke is your enemy! Even a few breaths of smoke and toxic gases can choke and kill you. If you become trapped in smoke, crawl low and keep your head down. Smoke and heat rise, so cleaner air is near the floor.

Contact your neighbors and local authorities to pre-plan community emergency procedures, such as

standard escape routes and common meeting places. Also, it is helpful to develop a community alert system that can be used during a fire or other emergency. With an alert system, anyone who spots an emergency will know how to react so that everyone in your neighborhood will be notified in time to respond.

Here are the steps you should take to plan your escape:

- Draw a floor plan of your home and mark all possible escape routes. Make sure you know two safe ways out of every room, especially the bedrooms.
- Prepare a list of valuables to take with you in an emergency. If you can, store these valuables together to save time later.
- Remember that young, elderly and disabled persons may need assistance. Their rooms should be located as close to an exit as possible. Train the rest of your family to help them get out in an emergency.
- Remind everyone to close doors behind them as they evacuate the house to slow down the spread of fire, smoke and heat.
- Decide on an outside meeting place to assemble your family and to make sure everyone is out.
- Practice your escape! Conduct home fire drills often, varying the drill to prepare for different fire situations. You may be blinded by smoke, so try practicing your escape plan with your eyes closed.

In the event of a fire, remember the following:

- Before you exit your room, feel the door. If it is hot, don't open it. Use your second way out.
- If smoke, heat or flames block both of your escape routes, stay in the room with the door closed.
- Stuff sheets, blankets or towels in cracks around the door and

around heating and air conditioning vents to keep smoke and fumes out.

- Open a window as long as no smoke is entering the room. Hang a bright sheet or cloth out the window to signal for help.
- If there is a phone in the room, dial 9-1-1 and tell the emergency dispatcher where you are.
- If you clothes catch fire: **STOP, DROP AND ROLL!**



Step 6: What To Do When You Are Threatened By Wildfire

If you have followed the advance preparation steps outlined in this booklet, you have created a Firewise house that has a better chance of surviving a wildfire. But when a wildfire is immediately threatening your area, there are additional steps you can take to help protect your home.

First, if you see a fire approaching your home, report it immediately by dialing 9-1-1. Remember to stay on the phone to answer additional questions the emergency dispatcher may ask.

Next, dress properly to prevent burns and lifelong scars. Wear long pants, cotton or wool long-sleeve shirts or jackets. Gloves and a damp cloth provide added protection. Do not wear short sleeve shirts or clothing made of synthetic fabrics.

If there is time before the fire arrives, take the following actions:

Emergency Wildfire Survival Checklist

Preparing to Evacuate

- Park your car in the garage, heading out with windows closed and keys in the ignition.
- Close the garage door but leave it unlocked; disconnect the automatic garage door opener in case of power failure.
- Place valuable documents, family mementos and pets inside the car in the garage for quick departure, if necessary.
- If you do evacuate, use your pre-planned route, away from the approaching fire front.
- Keep a flashlight and portable radio with you at all times.
- If you are trapped by fire while evacuating in your car, park in an area clear of vegetation, close all vehicle windows and vents, cover yourself with a blanket or jacket and lie on the floor.
- If you are trapped by fire while evacuating on foot, select an area clear of vegetation along a road, or lie in the road ditch. Cover any exposed skin with a jacket or blanket. Avoid canyons that can concentrate and channel fire.

Outside Your Home

- Move combustible yard furniture away from the house or store it in the garage; if it catches fire while outside, the added heat could ignite your house.
- Cover windows, attic openings, eave vents and sub-floor vents with fire resistive material such as 1/2-inch or thicker plywood. This will eliminate the possibility of sparks blowing into hidden areas within the house. Close window shutters if they are fire resistive.
- Attach garden hoses to spigots and place them so they can reach any area of your house.



- Fill trash cans and buckets with water and locate them where firefighters can find them.
- If you have an emergency generator or a portable gasoline-powered pump that will supply water from a swimming pool, pond, well or tank, clearly mark its location and make sure it is ready to operate.
- Place a ladder against the house on the side opposite the approaching fire to help firefighters in rapidly getting onto your roof.
- Place a lawn sprinkler on flammable roofs, but don't turn it on unless the fire is an immediate threat. You do not want to reduce the supply of water for the firefighters.

Inside Your Home

- Close all windows and doors to prevent sparks from blowing inside.
- Close all doors inside the house to slow down fire spread from room to room.
- Turn on a light in each room of your house, on the porch and in the yard. This will make the house more visible in heavy smoke or darkness.
- Fill sinks, bathtubs and buckets with water. These can be important extra water reservoirs.
- Shut off liquefied petroleum gas (LPG) or natural gas valves.
- Move furniture away from windows and sliding glass doors

to keep it from igniting from the heat of fire radiating through windows.

- Remove your curtains and drapes. If you have metal blinds or special fire resistant window coverings, close them to block heat radiation.

If You Stay in Your Home When a Fire Approaches

- Stay inside your house, away from outside walls.
- Close all doors, but leave them unlocked.
- Keep your entire family together and remain calm. Remember: if it gets hot in the house, it is many times hotter and more dangerous outside.

After the Fire Passes

- Check the roof immediately, extinguishing all sparks and embers. If you must climb onto the roof, use caution, especially if it is wet.
- Check inside the attic for hidden burning embers.
- Check your yard for burning woodpiles, trees, fence posts or other materials.
- Keep the doors and windows closed.
- Continue rechecking your home and yard for burning embers for at least 12 hours.



Before You Do Any Outdoor Burning!

Mississippi Forestry Commission Central Dispatch Regions

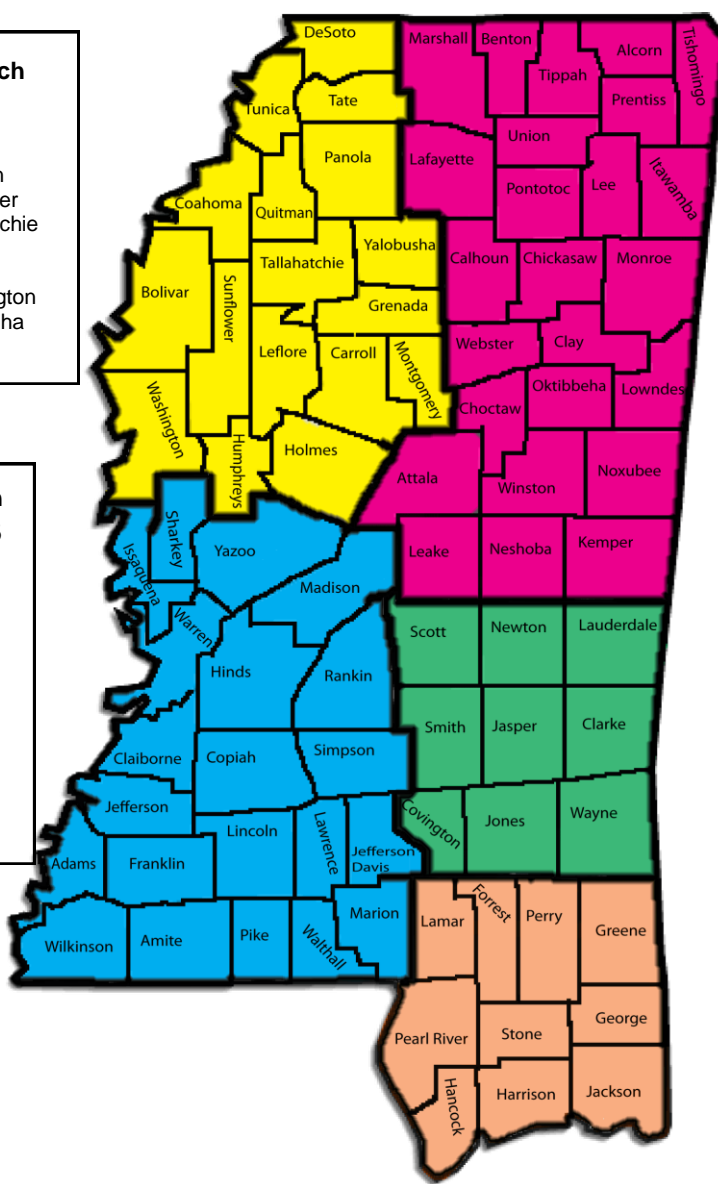
To report a **WILDFIRE**, call the appropriate central dispatch number.

Northwest Dispatch
1-877-226-5414

| | |
|------------|--------------|
| Bolivar | Panola |
| Carroll | Quitman |
| Coahoma | Sunflower |
| DeSoto | Tallahatchie |
| Grenada | Tate |
| Holmes | Tunica |
| Humphreys | Washington |
| Leflore | Yalobusha |
| Montgomery | |

Southwest Dispatch
1-888-823-3473

| | |
|-----------|-----------|
| Adams | Lincoln |
| Amite | Madison |
| Claiborne | Marion |
| Copiah | Pike |
| Franklin | Rankin |
| Hinds | Sharkey |
| Issaquena | Simpson |
| Jefferson | Walthall |
| Jefferson | Warren |
| Davis | Wilkinson |
| Lawrence | Yazoo |



Northeast Dispatch
1-800-681-8760

| | |
|-----------|------------|
| Alcorn | Marshall |
| Attala | Monroe |
| Benton | Neshoba |
| Calhoun | Noxubee |
| Chickasaw | Oktibbeha |
| Choctaw | Pontotoc |
| Clay | Prentiss |
| Itawamba | Tippah |
| Kemper | Tishomingo |
| Lafayette | Union |
| Leake | Webster |
| Lee | Winston |
| Lowndes | |

South Central Dispatch
1-800-736-9115

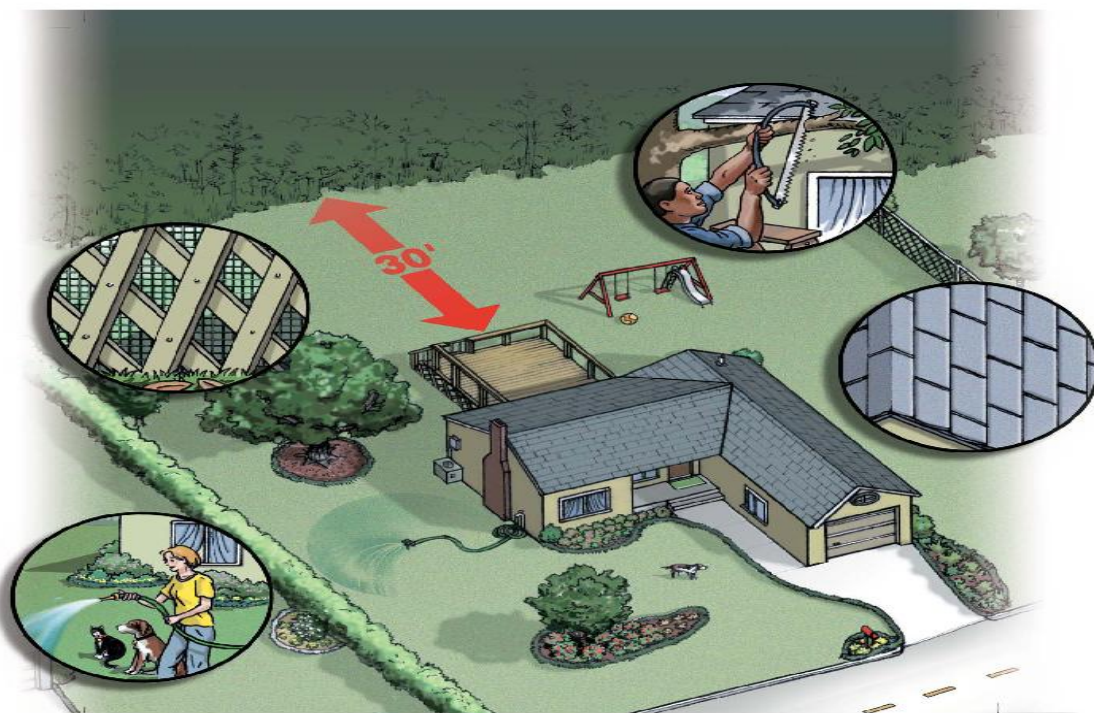
| | |
|------------|--------|
| Clarke | Newton |
| Covington | Scott |
| Jasper | Smith |
| Jones | Wayne |
| Lauderdale | |

Southeast Dispatch
1-800-240-5161

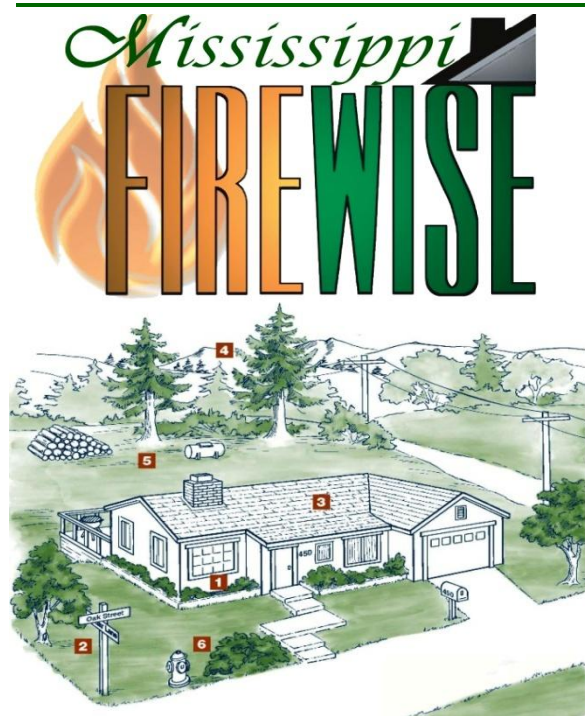
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| Forrest | Jackson |
| George | Lamar |
| Greene | Pearl River |
| Hancock | Perry |
| Harrison | Stone |

Be Firewise Mississippi

Create a 30-foot defensible space around your home



- Clear flammable vegetation up to 30 feet away from your house. You can leave some trees as long as their branches are 10 feet apart from other trees.
- Cut lower branches of trees 7-10 feet off the ground within the 30-foot defensible space.
- Eliminate ladder fuels by mowing tall grass, trimming shrubs and pruning lower branches as described above.
- Keep the lawn watered and mowed short (3 inches or less) on all sides of all buildings.
- Each spring, clean leaf & needle fall that accumulates.
- Relocate woodpiles (firewood) at least 30 feet from structures.
- Clean the roof, gutters, and windowsills of leaves, needles, and other debris.
- Make sure your chimney has a spark arrestor.
- Trim all tree branches within 15 feet of the chimney.
- Clear the view of your house number and mailbox so emergency crews can see the 911 address & house number from the street.
- Trim all tree branches overhanging the house.
- Trim tree branches overhanging the driveway to a 14-foot vertical clearance for emergency vehicles.
- Clear all deadwood and dense flammable vegetation within the 30-foot defensible space.
- Remove flammable debris from under decks or balconies.



Outside

1. Design/Construction

- ☐ Consider installing residential sprinklers.
- ☐ Build your home at least 30 – 100 feet from your property line.
- ☐ Use fire resistant materials.
- ☐ Enclose the underside of eaves, balconies and above ground decks with fire resistant materials.
- ☐ Try to limit the size and number of windows in your home that face large areas of vegetation.
- ☐ Make sure that electric service lines, fuse boxes and circuit breaker panels are installed and maintained as prescribed by code.
- ☐ Contact qualified individuals to perform electrical maintenance and repairs.

2. Access

- ☐ Identify at least two exit routes from your neighborhood.
- ☐ Construct roads that allow two-way traffic.
- ☐ Design road width, grade and curves to allow access for large emergency vehicles.
- ☐ Construct driveways to allow large emergency equipment to reach your house.
- ☐ Design bridges to carry heavy emergency vehicles, including bulldozers carried on large trucks.
- ☐ Post clear road signs to show traffic restrictions such as dead-end roads, and weight and height limitations.
- ☐ Cut back overhanging tree branches above roads.

How To Make Your Home Firewise

Homeowner's Checklist

- ☐ Make sure dead-end roads, and long driveways have turn-around areas wide enough for emergency vehicles.
- ☐ Construct turnouts along one-way roads.
- ☐ Clear flammable vegetation at least 10 feet from roads and five feet from driveways.
- ☐ Construct fire barriers such as greenbelts
- ☐ Make sure that your street is named or numbered, and a sign is visibly posted at each street intersection.
- ☐ Make sure that your street name and house number are not duplicated elsewhere in the county.
- ☐ Post your house number address at the beginning of your driveway, or on your house if it is easily visible from the road.

3. Roof

- ☐ Remove branches within 10 feet of your chimney and dead branches overhanging your roof
- ☐ Remove dead leaves and needles from your roof and gutters.
- ☐ Install a fire resistant roof. Contact your local fire department for current roofing requirements.
- ☐ Cover your chimney outlet and stovepipe with a nonflammable screen of ½ inch or smaller mesh.

4. Landscape

- ☐ Create a “defensible space” by removing all flammable vegetation at least thirty (30) feet from all structures.
- ☐ Never prune near power lines. Call your local utility company first.
- ☐ Landscape with fire resistant plants.
- ☐ On slopes or in high fire hazard areas remove flammable vegetation out to one hundred (100) feet or more.
- ☐ Space native trees and shrubs at least ten (10) feet apart.
- ☐ For trees taller than 18 feet, remove lower branches within six (6) feet of the ground.
- ☐ Maintain all plants by regularly watering, and by removing dead branches, leaves and needles.
- ☐ Before planting trees close to any power line, contact your local utility company to confirm the maximum tree height allowable for that location.

5. Yard

- ☐ Stack woodpiles at least thirty (30) feet from all structures and remove vegetation within ten (10) feet of woodpiles.
- ☐ Locate LPG tanks (butane and propane) at least thirty (30) feet from any structure and maintain ten (10) feet of clearance.
- ☐ Remove all stacks of construction materials, pine needles, leaves and other debris from your yard.
- ☐ Contact your local fire department to see if open burning is allowed in your area, if so, obtain a burning permit.
- ☐ Where burn barrels are allowed, clear flammable materials to at least ten (10) feet around the barrel; cover the open top with non-flammable screen with mesh no larger than ¼ inch.

6. Emergency Water Supply

- ☐ Maintain an emergency water supply that meets fire department standards through one of the following:
 - A community water/hydrant system,
 - A cooperative emergency storage tank with neighbors,
 - A minimum storage supply of 2,500 gallons on your property.
- ☐ Clearly mark all emergency water sources.
- ☐ Create easy firefighter access to your closest emergency water access.
- ☐ If your water comes from a well, consider an emergency generator to operate the pump during a power failure.

Inside



1. Kitchen

- ☐ Keep a working fire extinguisher in the kitchen.
- ☐ Maintain electric and gas stoves in good operating condition.
- ☐ Keep baking soda on hand to extinguish stove-top grease fires.
- ☐ Turn the handles of pots and pans containing hot liquids away from the front of the stove.
- ☐ Install curtains and towel holders away from burners on the stove.

- ☐ Store matches and lighters out of the reach of children.
- ☐ Make sure that electrical outlets are designed to handle appliance loads.

2. Living Room

- ☐ Install a screen in front of fireplace or wood stove.
- ☐ Store the ashes from your fireplace (and barbecue) in a metal container and dispose of only when cold.
- ☐ Clean fireplace chimneys and flues at least once a year.

3. Hallways

- ☐ Install smoke detectors between living space and sleeping areas.
- ☐ Test smoke detectors monthly and replace batteries twice a year, when clocks are changed in spring and fall.
- ☐ Install child safety plugs (caps) on all electrical outlets.
- ☐ Replace electrical cords that do not work properly, have loose connections or are frayed.

4. Bedroom

- ☐ If you sleep with the door closed, install a smoke detector in the bedroom.
- ☐ Turn off electric blankets and other electrical appliances when not in use.
- ☐ Do not smoke in bed.
- ☐ If you have security bars on your windows or doors, be sure they have an approved quick-release mechanism so you and your family can get out in the event of a fire.

5. Bathroom

- ☐ Disconnect appliances such as curling irons and hair dryers when done, store in a safe location until cool.
- ☐ Keep items such as towels away from wall and floor heaters.

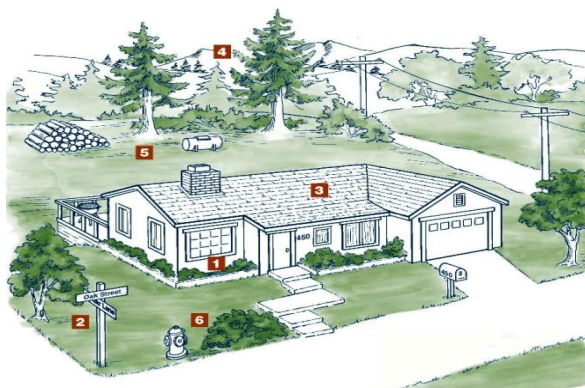
6. Garage

- ☐ Mount a working fire extinguisher in the garage.
- ☐ Have tools such as a shovel, hoe, rake and bucket available for use in a wildfire emergency.
- ☐ Install a solid door with self-closing hinges between living area and the garage.
- ☐ Dispose of oily rags in (Underwriters Laboratories) approved metal containers.
- ☐ Store all combustibles away from ignition sources such as water heaters.
- ☐ Disconnect electrical tools and appliances when not in use.

- ☐ Allow hot tools such as glue guns and soldering irons to cool before storing.
- ☐ Properly store flammable liquids in approved containers and away from ignition sources such as pilot lights.

Disaster Preparedness

- ☐ Maintain at least a three (3) day supply of drinking water, and food that does not require refrigeration and generally does not need cooking.
- ☐ Maintain a portable radio, flashlight, emergency cooking equipment, portable lanterns and batteries.
- ☐ Maintain first aid supplies to treat the injured until help arrives.
- ☐ Keep a list of valuables to take with you in an emergency; if possible, store these valuables together.
- ☐ Make sure that all family members are ready to protect themselves with STOP, DROP AND ROLL.
- ☐ For safety, securely attach all water heaters and furniture such as cabinets and bookshelves to walls.
- ☐ Have a contingency plan to enable family members to contact each other. Establish a family/friend phone tree.
- ☐ Designate an emergency meeting place outside your home.
- ☐ Practice emergency exit drills in the house regularly.
- ☐ Outdoor cooking appliances such as barbecues should never be taken indoors for use as heaters.



AFUERA

1. Diseño/Construcción

- ☐ Considere instalar rociadores residenciales
- ☐ Construya su casa a por lo menos 30 -100 pies de distancia del límite de la propiedad
- ☐ Utilice materiales de construcción resistentes al fuego
- ☐ Cubra la parte inferior de aleros, balcones y terrazas elevadas con materiales resistentes al fuego
- ☐ Trate de limitar el tamaño y el número de ventanas de su casa que miren hacia grandes áreas de vegetación
- ☐ Sólo instale ventanas de vidrio doble o triple
- ☐ Asegúrese de que las líneas de electricidad, las cajas de fusibles y los paneles de cortacircuitos estén instalados y mantenidos de acuerdo a los códigos
- ☐ Haga trato con personas calificadas para que realicen las tareas de mantenimiento y reparación eléctricas

2. Acceso

- ☐ Identifique por lo menos dos rutas para salir de su vecindario
- ☐ Construya caminos que permitan el tráfico de doble vía
- ☐ Diseñe caminos cuyo ancho, inclinación y curvas permitan el acceso a vehículos de emergencia de gran tamaño

How To Make Your Home Firewise

Homeowner's Checklist

- ☐ Construya entradas para coches que permitan que el equipo de emergencia voluminoso pueda llegar a su casa
- ☐ Diseñe puentes que puedan sostener vehículos de emergencia pesados, incluyendo topadoras transportadas en camiones grandes
- ☐ Coloque señales de tráfico claras que indiquen restricciones tales como caminos sin salida y las limitaciones de peso y altura
- ☐ Asegúrese de que los caminos sin salida y las entradas para coches largas tenga áreas para girar que sean lo suficientemente anchas para los vehículos de emergencia
- ☐ Construya apartaderos a lo largo de los caminos de una vía
- ☐ Remueva la vegetación inflamable hasta por lo menos 10 pies desde los caminos y 5 pies desde las entradas para coches
- ☐ Corte las ramas de los árboles que cuelgan sobre los caminos
- ☐ Construya barreras contra incendios, como cinturones verdes
- ☐ Asegúrese de que su calle tenga nombre o número y de que haya un cartel visible en cada intersección de la calle
- ☐ Asegúrese de que el nombre de su calle y el número de su casa no están repetidos en otra parte del condado
- ☐ Coloque la dirección de su casa al comienzo de su entrada para coches o en su casa si puede verse fácilmente desde el camino

3. Techo

- ☐ Quite las ramas que se encuentren a menos de 10 pies de su chimenea y las ramas secas que cuelguen sobre su techo
- ☐ Limpie todas las hojas y las agujas de pino secas del techo y de las canaletas
- ☐ Instale un techo que sea resistente al fuego. Comuníquese con su departamento de bomberos local para conocer los requisitos actuales de techado
- ☐ Cubra la salida de la chimenea y del conducto de la estufa con una pantalla no inflamable que tenga una malla de 1/2 pulgada o menor

4. Diseño del Jardín

- ☐ Cree un “espacio defendible”, quitando toda la vegetación inflamable en por lo menos 100 pies alrededor de las estructuras
- ☐ Nunca ponde plantas cerca de los cables de alta tensión. Primero llame a su compañía de servicios eléctricos
- ☐ Elija plantas que sean resistentes al fuego
- ☐ En las pendientes pronunciadas o en áreas con alto peligro de incendio, quite la vegetación inflamable en un área de 100 pies o más
- ☐ Plante árboles y arbustos nativos a por lo menos 10 pies de distancia entre sí
- ☐ Para los árboles de más de 18 pies de alto, ponde las ramas más bajas dejando seis pies limpios a partir del suelo
- ☐ Haga un mantenimiento de todas las plantas regándolas regularmente y removiendo las ramas, hojas y agujas muertas
- ☐ Antes de plantar árboles cerca de cualquier cable de alta tensión comuníquese con su compañía local de servicios para confirmar cuál es la máxima altura de árbol que se permite en esa ubicación

5. Jardín/Patio

- ☐ Almacene los montones de leña a por lo menos 30 pies de las estructuras y limpie la vegetación que se encuentra dentro de los 10 pies de la leña
- ☐ Ubique los tanques LPG (butano y propano) a por lo menos 30 pies de cualquier estructura y deje un espacio limpio alrededor de 10 pies
- ☐ Remueva todos los acumulamientos de materiales de construcción, agujas de pinos, hojas y otros desechos de su jardín
- ☐ Comuníquese con su departamento local de bomberos para saber si las quemadas al aire libre se permiten en su área; de ser así, obtenga un permiso para las mismas
- ☐ En los lugares en donde se permite realizar quemadas en barriles, quite los materiales inflamables de por lo menos 10 pies alrededor del barril; cubra la abertura con una pantalla no inflamable que tenga una malla no mayor de 1/4 pulgada

6. Suministro de Agua de Emergencia

- ☐ Mantenga un suministro de agua de emergencia que cumpla con las normas del departamento de bomberos, a través de uno de los siguientes:
 - un sistema comunitario de agua/toma de agua
 - un tanque de almacenamiento de emergencia en cooperación con los vecinos
 - un almacenamiento mínimo de 2,500 galones en su propiedad

- ☐ Marque claramente todas las fuentes de agua de emergencia
- ☐ Cree un acceso fácil para los bomberos a la fuente de agua de emergencia más cercana
- ☐ Si su agua proviene de un pozo, considere el uso de un generador de emergencia para operar la bomba durante un corte de energía eléctrica

ADENTRO



1 Cocina

- ☐ Tenga un extinguidor de incendios en la cocina
- ☐ Mantenga en buen estado el funcionamiento de las estufas eléctricas y de gas
- ☐ Tenga bicarbonato de sodio a mano para apagar los fuegos que se producen en los quemadores debidos a la grasa
- ☐ Mueva las asas de las ollas y las sartenes que contienen líquidos calientes fuera del frente de la estufa
- ☐ Coloque las cortinas y las toallas inflamables lejos de los quemadores de la estufa
- ☐ Guarde fósforos y encendedores fuera del alcance de los niños
- ☐ Asegúrese de que los tomacorrientes estén diseñados para soportar la carga de los aparatos electrodomésticos

2 Sala de Estar

- ☐ Instale una pantalla sacachispas frente a su chimenea o estufa de leña
- ☐ Coloque las cenizas de su chimenea (y del asado) en un recipiente de metal y deséchelas sólo cuando están frías
- ☐ Limpie las chimeneas del hogar y el tiraje por lo menos una vez al año

3 Pasillo

- ☐ Instale detectores de humo entre la sala de estar y las recámaras
- ☐ Verifique mensualmente el funcionamiento de los detectores de humo y reemplace las baterías dos

veces por año, cuando cambia la hora en la primavera y el otoño

- ☐ Instale enchufes a prueba de niños (tapas) en los tomacorrientes
- ☐ Reemplace los cables eléctricos que no funcionan correctamente, los que tienen conexiones flojas o aquellos que están pelados

4 Recámaras

- ☐ Si duerme con la puerta cerrada, instale un detector de humo en la recámara
- ☐ Apague las mantas eléctricas y cualquier otro aparato eléctrico cuando no esté en uso
- ☐ No fume en la cama
- ☐ Si tiene rejas de seguridad en las ventanas o puertas, asegúrese que tengan un mecanismo de liberación aprobado, así usted y su familia podrán salir de las recámaras en caso de un incendio

5 Baño

- ☐ Desconecte los aparatos calientes como las tenacillas para rizar el pelo y los secadores de pelo cuando termine de usarlos; guárdelos en un lugar seguro hasta que se enfríen
- ☐ Mantenga los artículos inflamables como las toallas lejos de los calentadores de pared y de piso

6 Garaje

- ☐ Instale un extinguidor de incendios en el garaje
- ☐ Tenga herramientas disponibles, como pala, azada, rastrillo y cubeta, para usarlas en caso de incendio
- ☐ Instale una puerta sólida, con bisagras que cierren por sí mismas, entre las áreas habitables de la casa y el garaje
- ☐ Deseche los trapos grasosos en recipientes metálicos aprobados por [®] (Underwriters Laboratories)
- ☐ Guarde todos los combustibles lejos de las fuentes de ignición como los termotanques
- ☐ Desconecte las herramientas eléctricas y los aparatos cuando no están en uso
- ☐ Deje que las herramientas calientes, como las pistolas de pegamento y las planchas para soldar se enfríen antes de guardarlas
- ☐ Guarde los líquidos inflamables apropiadamente en recipientes aprobados y lejos de fuentes de ignición como pilotos

Preparación en Caso de Desastres

- ☐ Guarde un suministro de por lo menos tres días de agua potable y comida que no requiera refrigeración y que generalmente no necesite ser cocinada

- ☐ Guarde una radio portátil, linterna, equipo de emergencia para cocinar, lámparas portátiles y baterías
- ☐ Tenga suministros de primeros auxilios para poder tratar a las personas lesionadas hasta que llegue ayuda
- ☐ Guarde una lista de los objetos de valor que llevará con usted en una emergencia; si es posible, guarde estos objetos de valor juntos en un mismo lugar
- ☐ Asegúrese de que todos los miembros de la familia estén preparados para protegerse a sí mismos con los pasos: PARE, CUERPO A TIERRA Y RUEDE
- ☐ Como medida de seguridad, fije a las paredes los termotanques y los muebles como armarios y bibliotecas
- ☐ Tenga un plan de emergencia que permita que los miembros de su familia se comuniquen entre sí – establezca un árbol telefónico con amigos/familiares
- ☐ Designe un lugar de encuentro para las emergencias que esté fuera de su casa
- ☐ Practique simulacros de emergencia para salir de la casa (EDITH) en forma regular
- ☐ Los aparatos que se utilizan para cocinar afuera como las barbacoas, nunca se deberán meter a la casa para usarse como calentadores

Firewise Landscaping

Firewise Landscaping Checklist

When designing and installing a Firewise landscape, consider the following:

- Local area fire history.
- Site location and overall terrain.
- Prevailing winds and seasonal weather.
- Property contours and boundaries.
- Native vegetation.
- Plant characteristics and placement (water, resin, and salt content, fuel load ratios and size).
- Irrigation requirements.



To create a Firewise landscape, remember that the primary goal is fuel reduction. To do this, create a series of defensive landscape zones. Zone 1 is closest to the structure and Zones 2-4 move progressively farther away:

- **Zone 1:** This well-irrigated area encircles the structure for at least 30 feet in all sides, providing space for fire suppression equipment in the event of an emergency. Plantings should be limited to carefully spaced, fire-resistant species.
- **Zone 2:** Fire-resistant plant materials should be used here. Plant should be low growing, and the irrigation system should extend into this section.
- **Zone 3:** Place low growing plants and well-spaced trees in this area, remembering to keep the volume of vegetation (fuel) low.
- **Zone 4:** The farthest zone from the structure is often a natural area. Thin selectively here and remove highly flammable vegetation.

Also remember to:

- Leave a minimum of 30 feet around the house to accommodate fire equipment if necessary.
- Carefully space the trees you plant.
- Take out ladder fuels, vegetation that serves as a link between grass and treetops. Ladder fuels can carry fire to a structure or from a structure to vegetation.
- Give yourself added protection with fuel breaks such as driveways, gravel walkways and lawns.

When maintaining a landscape:

- Keep trees and shrubs pruned. Prune all trees from 6 to 10 feet above the ground.
- Remove leaf clutter and dead and overhanging branches.
- Mow your yard regularly.
- Dispose of cuttings and debris promptly, according to local regulations.
- Store firewood away from the house.
- Be sure the irrigation system is well maintained.
- Use care when refueling garden equipment and lawn equipment and maintain it regularly.
- Store and use flammable liquids properly and carefully.
- Become familiar with local regulations regarding vegetative clearance, disposal of debris and fire safety requirements for equipment.
- Follow manufactures' instructions when using fertilizers and pesticides.

Firewise Construction

Firewise Construction Checklist



When constructing, renovating or adding to a Firewise home, consider the following:

- ☐ Choose a Firewise location.
- ☐ Design and build a Firewise structure.
- ☐ Develop and maintain a Firewise landscape.

To select a Firewise location, observe the following:

- ☐ Build on the most level portion of the land, since fire spreads more rapidly on any slope.
- ☐ Set a single story structure at least thirty (30) feet back from any ridge and increase the distance for buildings higher than one story.

In designing and building your Firewise structure, the primary goals are fuel and exposure reduction:

- ☐ Use construction materials that are fire-resistant or non-combustible whenever possible.
- ☐ For roof construction, consider using materials such as Class-A asphalt shingles, slate or clay tile, metal, cement and concrete products or terra-cotta tiles.
- ☐ On exterior wall cladding, fire-resistant materials such as stucco or masonry are much better than vinyl, which can soften and melt.
- ☐ Consider size and materials of windows: smaller panes of double glass or tempered glass are most effective; plastic skylights can melt.
- ☐ Cover windows and skylights with non-flammable screening shutters.
- ☐ Cover exterior attic and under-floor vents with 1/8-inch wire mesh; make sure under-eave and soffit vents are closer to the roof line than the wall.
- ☐ Include a driveway that is big enough to provide easy access for fire engines. Driveways should be at least twelve (12) feet wide with a fifteen (15) foot vertical clearance and a slope of less than twelve (12) percent. Driveways and access roads should be clearly marked and include ample turnaround space near the house. Also, consider access to a water supply if possible.
- ☐ Provide at least two ground level doors for safety exits and at least two means of escape in each room, so that everyone has a way out of a building in case of an emergency.
- ☐ Keep gutters, eaves and roof clear of leaves and other debris.
- ☐ Make an occasional inspection of your home or building, looking for deterioration such as breaks and spaces between roof tiles, warping wood or cracks and crevices in the structure.
- ☐ Inspect your property, clearing dead wood and dense vegetation from at least thirty (30) feet around your house. Move firewood away from the house or attachments, like fences or decks.

Any structures attached to the house, such as decks, porches, fences and outbuildings should be considered part of the house:

- ☐ If you wish to attach an all-wood fence to your home, use masonry or metal as a protective barrier between the fence and house.
- ☐ Use non-flammable metals when constructing a trellis and cover with high-moisture, non-flammable vegetation.
- ☐ Prevent combustible materials and debris from accumulating beneath a patio, deck or elevated porches. Screen under decks with 1/8-inch wire mesh.
- ☐ Make sure an elevated wooden deck is not located at the top of a hill where it will be in direct line of a fire moving up a slope, consider a terrace instead.

Quick Guide to Firewise Shrubs

How to incorporate Firewise shrubs into your landscape:

- Select the “right plant for the right place,” by choosing plants that are well adapted to the specific conditions where they are to be planted. Also consider the shrub’s flammability characteristics.
- **Highly flammable** shrubs should be planted beyond the defensible space, 30 feet or more from the house.
- **Moderately flammable** shrubs may be planted in isolated landscape beds within the defensible space, at least 15 feet from the house.
- **Low flammability** shrubs can be planted within the defensible space, 6 feet or more from the house.
- Conduct routine landscape maintenance, such as pruning shrubs, to maintain vertical and horizontal separation from other plants.
- Periodically remove dead or diseased plant material from plants within your home landscape.
- Remember, there are no “fireproof” plants. All plants and organic mulches burn in extreme weather or fire conditions.

Did you know you can select shrubs based on their flammability?

Researchers at the USDA Forest Service, University of Florida, and the National Institute of Standards and Technology have developed flammability categories to indicate how easily and intensely a shrub will burn.

High Flammability

Plant these shrubs 30 feet or more away from the house. Maintain them regularly.



Chinese juniper
Juniperus chinensis



Dwarf yaupon
Ilex vomitoria



Gallberry
Ilex glabra



Mountain laurel
Kalmia latifolia



Ashe juniper
Juniperus ashei



Boxwood
Buxus microphylla
var. *koreana*



Pipetern
Agarista populifolia



Azalea
Azalea obtusum



Glossy abelia
Abelia x grandiflora



Rhododendron
Rhododendron
x chionoides



Blue holly
Ilex x meserveae



Leyland cypress
Cupressocyparis leylandii

Moderate Flammability

Use cautiously in isolated landscape beds within the defensible space, 15 feet or more from the house.

Low Flammability

Shrubs suitable for planting within the defensible space; plant 6 feet or more from the house.



Adam's needle
Yucca filamentosa



Anisetree
Illicium floridanum



Arrowwood
Viburnum dentatum



Bayberry
Myrica pennsylvanica



Beautyberry
Callicarpa dichotoma



Bigleaf hydrangea
Hydrangea macrophylla



Butterfly bush
Buddleia davidi



Camellia
Camellia japonica



Coontie
Zamia pumila



Foster holly
Ilex x attenuata



Gardenia
Gardenia jasminoides



Klein's forsythia
Forsythia x intermedia



Oakleaf hydrangea
Hydrangea quercifolia



Oleander
Nerium oleander



Pittosporum
Pittosporum tobira



Rosebay
Rhododendron maximum



Scarlet firethorn
Pyracantha coccinea



Shrubby cinquefoil
Potentilla fruticosa



Sweet pepperbush
Clethra alnifolia



Walter's viburnum
Viburnum obovatum

For more information, contact Annie Hermansen-Baez of the USDA Forest Service, Southern Research Station at ahermansen@fs.fed.us, (352) 376-3271.

Also visit: www.interfacesouth.org/products/research.html



Weigela
Weigela florida



Winterberry
Ilex verticillata

Additional Resources

- For more information on Firewise shrubs, see "Selecting and Maintaining Firewise Plants for Landscaping" at www.interfacesouth.org/products/fact_sheets/Selecting_Firewise_Shrubs.pdf
- To estimate the flammability of shrub and other plant species not shown here, see "Preparing a Firewise Plant List for WUI Residents" at www.interfacesouth.org/products/fact_sheets/Preparing_Firewise_Plant_List.pdf or www.interfacesouth.org/products/flammability_key.html
- For Firewise landscaping tips, see www.interfacesouth.org/products/fact_sheets/Selecting_Maintaining_Firewise_Plants_Landscaping.pdf and www.interfacesouth.org/products/fact_sheets/Reducing_Wildfire_Risk.pdf

The photographs in this fact sheet were gathered from various sources. All copyrighted photographs in this publication were used with the permission of the photographers. Shrubs are listed in alphabetical order and not by their intensity of flammability within each category.



THE EASE OF IGNITION OF 13 LANDSCAPE MULCHES

by Larry G. Steward,¹ T. Davis Sydnor,² and Bert Bishop³

Abstract. The ease of ignition of 13 commonly used landscape mulches was evaluated. Mulches have different ignition potentials based on several factors, including the length of exposure to heat and to the ignition source. Some materials ignited more frequently when exposed to a lit propane torch for 15 seconds. The most to least commonly ignited materials were ground rubber, pine straw, oat straw, shredded hardwood bark, shredded cypress bark, recycled pallets, 2.5 to 5 cm pine bark nuggets, 1.3 to 2.5 cm pine bark nuggets, shredded pine bark, cocoa shells, composted yard waste, bluegrass sod, and brick chips. Not all organic mulches readily ignited, nor were inorganic mulches uniformly ignition resistant. The results of this research show that there are definite differences in the ease of ignition between commonly used mulches. The results demonstrate that landscapers do not have to resort to using inorganic materials such as brick chips and gravel for ignition-resistant mulches. Under high-temperature ignition, one inorganic material, ground rubber was ignited consistently and was difficult to extinguish. Conversely, there are organic materials that are unlikely to ignite. These also are maintenance practices that will prevent or reduce ignition of these mulches.

Key Words. Mulch; fire; ignition; combustion; pine bark; hardwood bark; straw; ground rubber.

Mulches are commonly applied after shrubs and ground covers are planted in the landscape. Mulches are chosen for a variety of aesthetic and economic reasons including eye appeal, color, availability, lawn maintenance equipment protection, and price. Mulches are also chosen for a variety of cultural reasons including reduction in soil moisture evaporation rates, nutrient content, reduction in weed competition, moderation of soil temperatures, and dust abatement (Appleton and French 1995; Rose and Smith 1996).

Many commercial and public facilities no longer permit smoking inside as a result of today's laws and policies. Cigarette and cigar smokers often discard lit smoking material into the landscaped areas as they enter a building, thus causing the potential for mulch ignition. As people move from smoking areas outside the building to areas within, discarded cigarettes smolder and may set the mulch on fire. Mulch fires, in turn, can place frame construction buildings at risk (Appleton et al. 1998; Dennis 1999; Cohen 2000).

The risk of a mulch fire is, perhaps, more common than one might expect. The Ohio State University Agricultural Technical Institute campus in Wooster, Ohio, U.S., had an incident in fall 2000 where smoldering mulch betrayed a subsurface mulch fire (Garrod 2000). In Columbus, Ohio, a mulch fire was credited with severely damaging a building (Narciso 1997). Scioto Dublin High School in Dublin, Ohio, was closed as a result of a mulch fire that contaminated the air-

handling system in the building (Sternberg 1997). An improperly discarded cigarette ignited the landscape mulch and then spread into the crawl space beneath the structure, damaging a Brookhaven National Laboratory structure (Levesque 2001). Problems such as the above have become enough of a nuisance at The University of Maryland that their Environmental and Safety Department developed a mulch fire standard operating procedure (Mulch Fire Standard 2002).

MATERIALS AND METHODS

Thirteen mulches commonly used as landscape mulches (Sydnor 1994; Rose and Smith 1996; Williams 1996; Relf 1997) were chosen for evaluation for their ease of ignition under natural field conditions. They included the following organic materials: shredded pine bark, shredded hardwood, shredded cypress, composted yard waste, 1.3 to 2.5 cm pine bark nuggets, 2.5 to 5 cm pine bark nuggets, pine straw (needles), recycled wooden pallets, cocoa shells, oat straw, and mixed grass sod. Inorganic materials included brick chips and ground rubber-tire mulches. The null hypothesis assumed that materials were equally easily ignited.

Aluminum edging strips were used to divide the test areas into circular areas of 0.84 m² each. The aluminum edging strips were used to prevent mulch from igniting adjacent blocks and contaminating adjacent areas with other mulching materials. Additionally, turf was employed to further separate the test areas. Mulch depth for each sample was approximately 10 cm (Sydnor 1994; Appleton and French 1995). Natural conditions were utilized to simulate landscape conditions and to identify conditions for future study.

The mulches were not treated with any fireproofing material (Hickman 1996). The purpose of this test was to demonstrate what could happen in the environment found in typical landscapes.

Mulches were applied to the test plots on October 19, 2000, and allowed to settle for 2 weeks prior to initiating ignition tests. The mulch materials were subjected to ignition by cigarettes, matches, and a propane torch. For the cigarette ignition tests, student volunteers were asked to ignite and then discard three lit filter cigarettes on the surface of each of the four replicates of each mulch sample. The cigarettes and mulches were monitored for 20 minutes to determine if the mulch material ignited. The period of time was measured in seconds from application of the burning cigarettes to ignition of the mulching materials.

Flames in excess of 15 cm high were noted and then extinguished. The cigarette ignition trial was repeated. The first test was conducted on November 2, 2000, 14 days after the mulch was applied, and the second test was conducted on July 27, 2001, to determine if there was any change in ease of ignition due to natural weathering. Weather conditions on November 2, 2000, were relatively calm (winds less than 8 km per hour) with temperatures near 10°C after a high of 20°C and a low of 1.1°C. There had been one day since measurable rain (0.254 mm), and the average relative humidity was 68% with a high of 98% and a low of 26% (Weather Records 2002).

The second test was done on July 27, 2001. Weather conditions on that day were air temperatures of 18.3°C at time of the test after a high of 27.2°C and a low of 13.3°C. Wind was relatively calm. The relative humidity averaged 54% with a high of 78% and a low of 26%. It had been one day since measurable amounts of rain (3.556 mm). (Weather Records 2002).

Match ignition tests were conducted on April 26, 2001. Three wooden matches were lit and thrown onto the surfaces of each of the four replicates of each. The time from ignition to an active flame in the mulch or when the matches burned out was recorded. The conditions at the time (mid-day) were clear, with a temperature of 12.8°C and a light breeze (8 km per hour) gusting to 11.3 km per hour. It had been 2 days since any measurable rainfall (0.254 mm). Relative humidity was an average of 58%, having been as high as 100% and as low as 20% (Weather Records 2002).

The propane torch ignition tests of the mulches were done on November 2, 2001. The flame of the propane torch was in contact with the surface of each of the four replicates of the mulch samples for 15 seconds. The torch flame was then removed, and the time from removal of torch flame until flames or coals were extinguished was recorded up to a maximum of 60 seconds. Residual flames or embers were mechanically extinguished after 60 seconds. Ease of ignition following the torch ignition tests was rated on a scale from 1 to 7 as follows:

- 1 = no flame or embers at 15 seconds
- 2 = flame at 15 seconds but no embers at 30 seconds
- 3 = flame at 15 seconds and embers at 30 seconds, but no embers at 60 seconds
- 4 = flame at 30 seconds, but no embers at 60 seconds
- 5 = flame at 15 seconds and embers at 60 seconds, with embers extinguished
- 6 = flame at 30 seconds and embers at 60 seconds, with embers extinguished
- 7 = flame at 60 seconds with flames and embers extinguished

The environmental conditions that afternoon were clear, 10°C, with an average relative humidity of 83% after a high of 100% and a low of 60%. It had been a week since a measurable amount of rain (0.254 mm) had fallen (Weather Records 2002).

Originally, four replicates of the 13 mulches were arranged in a randomized block pattern. There was no blocking effect in any of the tests; thus, the data were analyzed as a completely random design. Data from the torch ignition tests were evaluated using analysis of variance with mean separations using the least significant differences.

Ignition following the cigarette ignition and match ignition tests was rated in a binary fashion as either igniting or not and evaluated using logistic regression tests. Differences were determined using Fisher's Exact Test.

RESULTS AND DISCUSSION

Cigarette Trials

Based on the two cigarette trials, cigarettes discarded on the mulch surfaces were able to ignite composted yard wastes and ground recycled pallets more often than ground rubber, pine straw, shredded hardwood, 2.5 to 5 cm pine bark nuggets, cocoa shells, brick chip mulches, and bluegrass sod (Table 1).

Oat straw, shredded cypress bark, 1.3 to 2.5 cm pine bark nuggets, and shredded pine bark ignited infrequently enough that they were not statistically different than those that never ignited (Table 1). Interestingly, oat straw ignited only during the first trial, while shredded cypress bark, recycled yard wastes, shredded pine bark, and ground recycled pallets ignited only after being in the landscape for 6 months (data not shown). Weathering of the materials appears to decrease the ease of ignition of oat straw while increasing the ignitability of the other four mulches.

Table 1. The number of times that specific mulch types ignited after three cigarettes were discarded on the surface of the mulch is given. Each trial was conducted twice on each of the four replicates.

| Mulching material | Times ignition occurred _z |
|---------------------------------|--------------------------------------|
| Ground recycled pallets | 4 _y |
| Composted yard waste | 4 _y |
| Shredded pine bark | 3 |
| Oat straw | 2 |
| Shredded cypress bark | 2 |
| Pine bark nuggets 1.3 to 2.5 cm | 1 |
| Decorative ground rubber | 0 |
| Pine straw (needles) | 0 |
| Shredded hardwood bark | 0 |
| Pine bark nuggets 2.5 to 5 cm | 0 |
| Cocoa shells | 0 |
| Bluegrass sod | 0 |
| Brick chips | 0 |

^yIgnition of each mulch was attempted eight times (2 trials * 4 replicates) using lighted cigarettes. ^zMulches that ignited four times out of eight attempts were different, at the 0.05 level of significance, from mulches that never ignited using the Fisher's Exact Test. Logistic regression showed no differences between mulches that sometimes ignited.

Match Tests

Mulches were also ignited by matches, but the match ignition test was not repeated. So few replicates of the various types of mulch ignited this way that statistical differences were not identified. The match test was done after the mulches had been in place for 6 months. Although not statistically significant, some replicates of pine straw, oat straw, and the decorative ground rubber sometimes ignited using matches (data not shown).

Torch Tests

Sod and brick chips did not ignite and did not ignite under any of the conditions tested. This was as expected. The torch killed grass foliage, but the live tissue did not allow the flame to propagate itself after the torch flame was removed. Brick is an inorganic material. Only debris such as grass clippings on the brick mulch burned, but it was not in sufficient quantity to allow the flame to propagate after the torch was removed.

One of the most ignition resistant of the organic mulches was cocoa shells. Cocoa shells were statistically more fire resistant ($\alpha = 0.05$) than decorative ground rubber, pine needles, oat straw, shredded hardwood bark, and shredded cypress bark (Table 2).

Composted yard waste responded interestingly and resisted ignition using the propane torch for 15 seconds (Table 2). Cigarettes, on the other hand, ignited composted yard wastes as readily as any material (Table 1). Composted yard waste smoldered when ignited by cigarettes but did not burst into flame. The longer time that a cigarette smolders on the composted yard waste surface may well be the difference. Smoldering mulch (duff) may be as dangerous as flaming mulch to the surrounding plants (Dickinson and Johnson 2001) and introduces the impact of soil heating that is not seen when the duff layer does not smolder (Miyanishi 2001). The smoldering mulch might escape detection and be allowed to burn longer. Furthermore, the longer time that smoldering mulch would be in contact with the bark of a tree or shrub might result in greater cambial heating and thus more extensive cambial injury.

Hardwood and pine bark mulch products were generally intermediate in tolerance to torch ignition. While not always statistically significant, pine bark mulch products were more torch resistant than hardwood products (Table 2). While hardwood mulches caught fire, the flames and embers usually died out without having to be put out. Generally, the torch ignitions failed to propagate; ease of ignition ratings were below four, with the exception of shredded hardwood bark (Table 2).

Pine straw and oat straw usually had to be put out by the investigators, as shown by their ease of ignition ratings of five or higher (Table 2). These fires propagated following torch ignition; therefore, these mulches would be expected to be a significant concern in the landscape.

Decorative ground rubber ignited each time it was exposed to the propane torch and produced spreading flames in 60 seconds. Ground rubber always had to be

Table 2. Propane torch flammability ratings of 13 mulching materials commonly used in landscape maintenance operations. Ease of ignition ratings is the average of two trials with four replicates in each trial.

| Mulching material | Times ignition occurred |
|---------------------------------|-------------------------|
| Decorative ground rubber | 7.00 |
| Pine straw (needles) | 6.88 |
| Oat straw | 5.00 |
| Shredded hardwood bark | 4.13 |
| Shredded cypress bark | 4.00 |
| Ground recycled pallets | 3.75 |
| Pine bark nuggets 2.5 to 5 cm | 3.25 |
| Pine bark nuggets 1.3 to 2.5 cm | 3.13 |
| Shredded pine bark | 2.88 |
| Cocoa shells | 2.63 |
| Composted yard waste | 2.13 |
| Bluegrass sod | 2.13 |
| Brick chips | 1.13 |
| LSD ₀₅ | 1.19 |

Ease of ignition ratings:

- 1 = No flame at 15 seconds. No embers at 15 seconds.
- 2 = Flame at 15 seconds. No embers at 30 seconds.
- 3 = Flame at 15 seconds. Embers at 30 seconds. No embers at 60 seconds.
- 4 = Flame at 30 seconds. No embers at 60 seconds.
- 5 = Flame at 15 seconds. Embers at 60 seconds. Extinguished.
- 6 = Flame at 30 seconds. Embers at 60 seconds. Extinguished.
- 7 = Flame at 60 seconds. Extinguished.

extinguished by the investigators (Table 2). The flames often spread rapidly and were extinguished with difficulty. Decorative ground rubber is sometimes recommended for use in playgrounds to cushion falls, but in our judgment is far too easily ignited for this use. The article "Playground Fires Tied to Cigarettes" reaffirms our concern (Playground Fires 1997).

The mulches that were the most fire resistant under all methods of ignition were cocoa shells, sod, 2.5 to 5 cm pine bark nuggets, shredded hardwood, and brick chips under the test parameters. These mulches might serve as standards for further testing.

One of the purposes of this study was to employ natural landscape conditions and to identify areas for further study. Some of the mulches were ignited by cigarettes that smoldered on the mulch surfaces for several minutes but not by 15 seconds of exposure to the torch, even though the torch ignition temperature was presumably much higher. This suggests that the length of time the mulch is subjected to the ignition source as well as its actual temperature will affect mulch ignition. Moisture content of the mulches is another area deserving of study. Weathering affected mulches differently in this study, with some mulches increasing in ignitability and others decreasing. This finding suggests additional investigation of mulches not evaluated in this study. Finally, the ignition point of various mulches should be defined under standardized test conditions.

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Résumé. La facilité d'ignition de 13 paillis habituellement utilisés dans les aménagements paysagers a été évaluée. Les paillis ont différents degrés potentiels d'ignition basés sur plusieurs facteurs incluant le temps d'exposition à la chaleur et la source d'ignition. Certains matériaux s'allument plus fréquemment lorsqu'ils sont exposés à une torche au propane allumée durant 15 secondes. Les matériaux dont l'ignition est la plus facile vers ceux la plus difficile sont les résidus de caoutchouc, la fibre de pin, la paille d'avoine, l'écorce déchiquetée de bois durs, l'écorce déchiquetée de cyprès, les palettes recyclées, 2,5 à 5 cm d'écorce grossière de pin, 1,3 à 2,5 cm d'écorce grossière de pin, l'écorce de pin déchiquetée, les écailles de noix de coco, le compost de déchets végétaux, le gazon sec, et les cailloux de briques. Ce n'était pas tous les paillis organiques qui avaient une ignition instantanée, pas plus que les paillis inorganiques étaient tous uniformément résistants à l'ignition. Les résultats de cette recherche démontrent qu'il y a des différences définies dans la facilité à l'ignition entre les divers paillis communément employés. Les résultats démontrent que les paysagistes n'ont pas à recourir uniquement aux matériaux inorganiques tels que les cailloux de brique et le gravier comme paillis résistants à l'ignition. Lors de l'ignition avec une torche au propane, un matériau inorganique, le résidu de caoutchouc, s'est allumé de manière appréciable et de plus s'est avéré difficile à éteindre. Inversement, il y a des matériaux qui sont non propices à s'allumer, et il y a des pratiques d'entretien qui permettent de prévenir ou de réduire les risques d'ignition.

Zusammenfassung. Hier wurde das Selbstentzündungspotential von 13 häufig verwendeten Mulchmaterialien bewertet. Mulche haben ein unterschiedliches Potential zur Selbstentzündung, die auf verschiedenen Faktoren, einschließlich der Dauer der Sonnenexposition und der Zündquelle basiert. Einige Materialien entzündeten sich häufiger, wenn sie über 15 sec. einer offenen Propanflamme ausgesetzt sind. Die Reihenfolge von meist bis wenig entzündbar beträgt:

gemahlenes Gummi, Kiefernadeln, Weizenstroh, Hartholzrinde, Kakaoschalen, Kompost, Schilfsoden und Ziegelbruch. Nicht alle organischen Mulche entzündeten sich sofort, noch bestand bei ihnen eine ähnliche Zündungshemmung. Die Ergebnisse zeigen, dass Landschaftsgärtner sich nicht zurückhalten müssen beim Einsatz von organischen Mulchen und auf nichtorganische Mulche wie Ziegelbruch und Split ausweichen müssen. Unter Propanzündung konnte ein nichtorganischer Mulch, gemahlendes Gummi entzündet werden und es war schwierig wieder zu löschen. Auf der Gegenseite gibt es organische Mulche, die schwer entzündbar sind und es gibt Erhaltungsmaßnahmen, welche die Gefahr der Selbstentzündung reduzieren.

Resumen. Se evaluó la facilidad de ignición de trece mulches comúnmente utilizados en paisajes. Los mulches tienen diferentes potenciales de ignición con base en varios factores incluyendo la duración de exposición al calor y la fuente de ignición. Algunos materiales de mayor ignición fueron expuestos a una llama de propano por quince segundos. Los materiales de ignición más fácil fueron: paja de pino, paja de encino, corteza en tiras de maderas duras, corteza en tiras de ciprés, paletas recicladas, trozos de corteza de pino de 2.5 a 5 cm, trozos de corteza de pino de 1.3 a 2.5 cm, corteza de pino desmenuzada, cáscaras de cacao, compost de desperdicios de jardinería, pasto seco y trozos de tabique. No todos los mulches orgánicos quemaron fácilmente, ni tampoco los inorgánicos resistieron uniformemente. Los resultados de esta investigación muestran que hay diferencias claras en la facilidad de ignición entre los mulches comúnmente utilizados. Los resultados demuestran que los paisajistas no tienen que recurrir a utilizar materiales inorgánicos tales como tabique y grava. Bajo la llama de propano, un material inorgánico ardió consistentemente y fue difícil de extinguir. Inversamente, hay materiales orgánicos que no arden fácilmente.

50 FIREWISE Things You Can Do ... to protect your home

No Cost, Just A Little Time.

- Contact someone to perform a Firewise assessment of your home.
- Contact your local VFD.
- Clean your roof/gutters of leaves/needles.
- Clear the view of your house numbers so it can be easily seen from the street.
- Put a hose (at least 100' long) on a rack and attach it to an outside faucet.
- Trim all tree branches overhanging your house.
- Trim all tree branches within 15' of chimney.
- Rake debris accumulation away from house 15' or more.
- Cut back trees/shrubs from shoulder of driveway.
- Trim tree branches overhanging the driveway to a 14' vertical clearance for emergency vehicles.
- In fall, mow dry grasses to less than 6" for 30' around the house.
- Cut lower branches of trees 7 – 10' off the ground within the defensible space.
- Clear deadwood and dense flammable vegetation within the defensible space.
- Remove any wood/flammable materials from underneath decks/balconies.
- Relocate woodpiles at least 30' from structures.
- Clear away flammable vegetation within 10' of woodpiles.
- Compost leaves, etc.
- Use cut trees/branches for firewood.
- Discuss/plan an escape route with your family.
- Have practice drills. Include all family and pets.

- Check fire extinguishers. Are they charged? Accessible? Does everyone know where they are kept and how to use them?
- Get involved with community mitigation efforts.
- Review your homeowner's insurance policy for adequate coverage.
- Talk to children about fire and matches.
- Post toll free numbers to report a wildfire on your refrigerator.
- If you have a burn barrel that you use for burning trash, STOP!
- Compost leaves in the fall, don't burn them.
- Always have a shovel on hand and hook up the garden hose BEFORE you start the fire.
- Never burn if the smoke and flames are blowing toward your home (or your neighbor's home).
- Mississippi Forestry Commission's website: www.mfc.ms.gov.

Minimal Cost Actions \$

- Install visible house numbers on your home (at least 4 inches tall).
- Post house numbers at end of long driveways using non-flammable material.
- Install a spark arrestor or non-flammable screen with mesh less than ½" on chimneys.
- Cover exterior attic, soffit and underfloor vents using non-flammable screen with mesh less than ⅛".
- Install fire extinguishers in the kitchen and garage.
- Host a neighborhood meeting to talk about mitigation and fire safety.
- Separate an attached wood fence from your house with a metal shield, block pillar or other non-flammable material.

Moderate Cost Actions \$\$

- Build a turn around in your driveway big enough to accommodate an emergency vehicle.
- Modify driveways gates to allow emergency vehicle access. They should be at least 10' wide, set back 30' from the road, accessed easily or lock should be able to be broken if necessary.
- Enclose decks/balconies with fire-resistive materials.
- Replace vinyl gutters/downspouts with non-flammable metal gutters/downspouts.
- Enclose foundations with concrete block or other fire-resistive building materials.
- Use fire resistant plants and materials for home landscaping.

High Cost \$\$\$

- Replace your roof with fire-resistive materials such as Class A shingles.
- Install a roof irrigation or sprinkle system to protect your home's roof.
- Replace siding or outside walls with fire-resistive or non-combustible materials.
- Replace single-paned windows with double or triple-paned glass.
- Improve road, driveways and bridges to carry at least 45,000 lbs.
- Relocated propane tanks at least 30' from structures, preferably on the same contour.
- Improve your driveway by widening, straightening sharp curves and filling in dips.

WOODY PLANTS

General recommendations for applying herbicides to forest trees, bush, and woody vines.

CUT-SURFACE TREATMENTS: FOREST TREES

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|-----------------------|---|--|--|--|
| Injection | Trees 1 inch in diameter and larger. | Any season, but growing season treatments are most effective. Avoid sap rise and leaf expansion in spring if possible. | (1) 2,4-D (amine) – 4 lb/gallon. | Apply 1 ml solution in each cut; space cuts 2 inches apart, edge to edge about waist high. Use on all species any time of year. Overlap injector cuts on hard-to-kill species, such as hickory, dogwood, blue beech, and ash. Do not allow picloram to spill into the root zone of desirable and very susceptible species such as yellow poplar and pine. Make cuts through the bark completely around the tree with not more than 2 inches between cut edges. Spray or brush Chopper solution into the cuts until thoroughly wet. Make one cut for every 3 inches diameter breast height. Spray 1 ml into each cut. Best results obtained from September – March. Apply 1 ml of solution for every 2 inches trunk diameter. |
| | | | (2) triclopyr (Garlon 3A) diluted 1 part Garlon 3A: 1 gallon water. | |
| | | | (3) picloram + 2,4-D (Pathway). | |
| | | | (4) imazapyr (Arsenal Applicators Concentrate) dilute solution: mix 4 - 6 oz Arsenal AC per gal water. | |
| Stump | Sprout control on cut hardwood stumps, particularly on species that sprout profusely: oaks, maple, beech, hickories | Any season, but most effective as soon as possible after cutting; if possible, treat the same day of cutting. | (5) imazapyr (Arsenal Applicators Concentrate) concentrated solution: mix 25 oz Arsenal AC with no more than 103 oz water. | Apply with low volume knapsack sprayer using solid-cone nozzle of medium orifice. Triclopyr in diesel fuel can be applied to stumps as late as 3 months after cutting. Spray or brush the Chopper solution onto the cambium area (just inside the bark) of freshly cut stumps until thoroughly wet. Spray or brush the Arsenal solution onto the cambium area (just inside the bark). Ensure that the solution thoroughly wets the entire cambium. |
| | | | (6) glyphosate (Accord SP) diluted 1 part Accord SP: 2 parts water | |
| | | | (1) 2,4-D (amine) — 20 lb/100 gal. | |
| | | | (2) picloram + 2,4-D (Pathway). | |
| | | | (3) triclopyr — 20-25% Garlon 4, + 10% surfactant, + 65-70% diesel fuel. | |
| | | | (4) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil. | |
| | | | (5) imazapyr (Arsenal Applicators Concentrate) — mix 4-6 oz Arsenal AC per gallon of water. | |

Consult labels for approved adjuvants.

Weed resistance to recommended use-rates of certain herbicides has been documented in Mississippi – SEE PAGE 4.

2008 Weed Control Guidelines for Mississippi. Publication 1532, pages 141 - 149, Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station.

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|--|---|---|---|---|
| BARK, FOLIAGE, AND SOIL TREATMENTS: | | | | |
| BRUSH AND FOREST TREES | | | | |
| Basal Bark | Scattered brush or "clumps" of hardwood brush and small trees. Can be used on species remaining after foliar spray. Expect poor control on root suckering species: black locust, hickories, and sassafras. Best results on trees less than 3 inches diameter. | Any season (Avoid leaf expansion). Late summer, fall, and winter. Reduced control may occur during sap rise or leaf expansion in spring. | (1) 2,4-D + 2,4-DP (LV esters) - 8 to 12 lb each per 100 gal oil. (2) triclopyr — 1.5 gal Garlon 4 + 98.50 gal diesel fuel. (3) 2 gal Garlon 4 + 25 gal diesel + 0.5 gal surfactant + 72.5 gal water. (4) triclopyr + picloram — 1-2 gal Access in oil to make 100-gal mix. (1) imazapyr (Chopper) — mix 8-12 oz Chopper per gallon of water, diesel, or penetrating oil. | Drench lower 12 to 15 inches of plant. Density of brush will determine rate per acre. Spray the lower 1.5 to 2 feet of brush to runoff, ensuring coverage of root crown. Follow label directions for mixing. Apply as above. Works best on basal diameters up to 6 inches. Drench lower 1.5 to 2 feet of stem. Apply to wet the lower 12-18 inches of hardwood stems less than 4 inches in diameter at breast height. Ensure that the roots of desirable hardwoods do not extend into the treated area. |
| Stream-Line thinline | Same as above except best on trees less than 3 inches diameter with juvenile bark | Best results obtained in March-June. | (1) triclopyr 20-25% Garlon 4 + 10% v/v surfactant + 60-75% diesel fuel. | With a backpack sprayer and a straight stream nozzle, a 2- to 3-inch-wide band of herbicide is sprayed on each stem. Treat the stem from two sides if it is 1- to 3-inch diameter to ensure that the herbicide completely encircles the stem. |
| Selective Hardwood Control in Pine Plantations | Hardwood sprouts and large trees in young (1-6 yr-old) pine stands | July through early October. | (1) imazapyr (Arsenal Applicator Concentrate) apply 16-32 oz Arsenal AC per acre in 10-15 gal water. Add 0.25% v/v nonionic surfactant. (2) imazapyr (8-9 oz Arsenal AC) + metsulfuron (1-1.5 oz Escort XP) per acre. (3) imazapyr (Arsenal Applicators Concentrate) mix 1 oz Arsenal AC per gal of water. Add 0.5% v/v minimum nonionic surfactant. | Apply as a broadcast spray to release loblolly and Virginia pine. Use 12-16 oz Arsenal AC to release slash pine or shortleaf pine stands at the end of the third growing season or thereafter. Apply broadcast in 10-15 gallons of spray per acre. Apply to individual hardwood crowns. Spray to obtain good coverage of the entire crown, but not to the point of runoff. Effective in controlling hardwood sprouts less than 7 feet in height for forest site preparation and pine release. Use as a directed spray to release any conifer species. |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|---|--|---|--|---|
| Foliage Spray (low volume, aerial, non-selective) | Large tracts of mixed brush and hardwoods on utility rights-of-way and for range and pasture establishment. All unwanted small trees and shrubs for site preparation in advance of seeding or planting forest trees. | During growing season from late spring to early summer. Effectiveness is decreased during periods of drought. | (1) 8-12 lb 2,4-DP (LV esters) per 30 gal water per acre. | Use aerial application, low-volume sprayer. Use drift control agent in mixture. See Weedone 2,4-DP label for specific instructions. |
| | | | (2) 2 lb each of 2,4-D and 2,4-DP (LV esters) and 1.66 lb MSMA per 10 gal water. | Apply 10 gallons of spray per acre before planting to reduce competition from mixed hardwoods and brush. |
| | | | (3) triclopyr + picloram + 2,4-D — 0.5 gal Garlon 4 + 1.5 gal Tordon 101 mixture. | Apply 10-15 gallons of spray per acre. |
| | | | (4) 0.5 gal Garlon 4 + 0.5 gal Tordon K. | Apply 10-15 gallons of spray per acre. |
| | | | (5) hexazinone 1-3 gal Velpar L per acre. Rate depends on soil texture. | For exact rate of Velpar L, consult label. Rate dependent on soil texture. |
| | | Midsummer to fall. | (1) glyphosate — 6-8 qt Accord SP in 10 gal water. Addition of nonionic surfactant at 2.5% v/v is recommended. | |
| | | | (2) imazapyr — 48-64 oz of Chopper EC per acre. Addition of nonionic surfactant at 0.5-1% v/v is recommended. | Best results are obtained from late summer or early fall applications; however, Chopper AC can be applied year-round. |
| | | Late summer to early fall. | (1) imazapyr (Chopper EC) — apply 48-64 oz per acre in 10-15 gal water. Add 0.5-1% v/v nonionic surfactant. | |
| | | | (2) imazapyr + glyphosate — 32-48 oz Chopper EC + 4-5 qt. Add 0.5-1% v/v nonionic surfactant. | |
| | | | (3) imazapyr + triclopyr — 32-48 oz Chopper EC + 32-40 oz Garlon 4. Add 0.5-1% v/v nonionic surfactant. | |
| | | | (4) imazapyr + metsulfuron methyl 40-48 oz Chopper EC + 1-2 oz Escort XP. Add 0.5-1% v/v nonionic surfactant. | |
| | Heavy hardwood competition and residual pine. | During growing season from leaf out to fall colors. | (1) glyphosate + imazapyr — 1-5 qt Accord SP + 32-64 oz Chopper EC or 1-3 qt Accord SP + 40-64 oz Chopper EC per acre in 10-15 gal of water. Add 0.5% v/v nonionic surfactant. | Apply as a broadcast spray by ground equipment or helicopter for forest site preparation. |
| | | | (2) glyphosate + triclopyr — 3-6 qt Accord SP + 1-2 qt Garlon 4 + 2.5% v/v nonionic surfactant. | Apply 10-15 gallons solution per acre. |
| | | | (3) fosamine + imazapyr — 4.6 qt Krenite UT + 16-20 oz Chopper + 1.5% v/v nonionic surfactant in 10-15 gal of water | Apply as a broadcast spray by ground equipment or helicopter for forest site preparation. |
| | | Full leaf to Aug. 1. | (1) 2 qt Tordon K + 1 qt Garlon 4 + 16-24 oz Chopper EC. | Use nonionic surfactant at 0.5% v/v. |
| | | | (2) 4-8 qt Krenite UT + 16-24 oz Chopper EC + 1% v/v nonionic surfactant. | |
| | | | (3) 2 oz Escort XP + 3 qt Garlon 3A + 1% v/v nonionic surfactant. | Spray to wet. |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|---|---|--|---|--|
| | Light hardwood competition and residual pine and grasses. | Full leaf to Aug. 1. | (1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal. (2) 8 qt Tordon 101M + 8-10 oz Arsenal. | Use nonionic surfactant at 0.5% v/v. |
| | | June 1 to leaf drop. | (3) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant. | Use higher rates for Virginia and Shortleaf pine. Spray to wet. |
| | Hardwood, pine, and grass. | Aug. 1 to fall color. | (1) 2 qt Tordon K + 1-2 pt Garlon 4 + 8-10 oz Arsenal. | Use nonionic surfactant at 0.5% v/v. |
| | | June 1 to leaf drop. | (2) 4-8 qt Krenite UT + 16-20 oz Arsenal AC + 1% v/v nonionic surfactant. | Use higher rates for Virginia and Shortleaf pine. Spray to wet. |
| Foliage Spray (high volume, ground) | Scattered brush or "clumps" of hardwood brush. Can be used on species not controlled by prior sprays, such as maple, oak, ash, and persimmon growing along fence rows, highways, rights-of-way, and other non-crop areas. | Late spring and summer from time foliage is fully developed. Dormant season ineffective. Growing season from leaf out to fall colors. Late spring to fall color | (1) 2-3 lb each of 2,4-D and 2,4-DP (LV esters) per 100 gal water. (2) 1-3 qt Garlon 4 per 100 gal water. (1) glyphosate — 2-4 qt of Accord SP per 100 gal of water. Add 1-2 qt nonionic surfactant. (1) 4-8 qt Krenite UT + 2 oz Escort XP per 100 gal water + 1% v/v non-ionic surfactant. (2) 2 oz Escort XP + 3 qt Garlon 3A+ 1% v/v nonionic surfactant per 100 gal water. | Apply uniformly over top of brush as a coarse spray. With back-pack sprayer, wet all foliage to point of runoff. With hydraulic sprayer, apply 200 to 600 gallons of spray mixture per acre, depending on height and density of brush. Apply 100-400 gallons of spray per acre depending on size and density of woody plants. Spray to wet. Apply 100-200 gallons of spray per acre. Spray to wet. Apply 100 gallons per acre. Spray to wet. Spray to wet. |
| Soil application with hand-gun applicator | Individual trees or scattered "clumps" of trees or brush. Can be used to treat large tracts with mixed brush and hardwoods. | Mid-March through May. Rain after application is required to activate the herbicide. | 2-4 ml of 25% hexazinone (Velpar L) for each inch of stem diameter. For grid pattern to use in site preparation, refer to Velpar L label. | Apply undiluted with exact-delivery hand-gun applicator. Direct treatment to soil within 3 feet of root collar of trees to be controlled. For large trees requiring more than one delivery, make applications on opposite sides of the stem. Rate of herbicide when applied in a grid pattern will depend on soil texture. Refer to the Velpar L label for exact rates. |
| Soil application (dry materials) | Individual trees. | Early spring applications are most effective. | (1) 10% hexazinone (Pronone 10G) — 0.5- 0.75 oz per inch diameter of tree. | Apply completely around base of tree. Do not apply in root zone of desirable plants. If root grafting occurs, some desirables may be killed outside the treatment area. Increase rates on fine-textured soils (clay, etc.). If slope is greater than 12-15%, damage down the slope from treatment area may occur. |
| | "Clumps" of brush of all species and sizes. Forestry site preparation and rights-of-way. | Apply before or during period of active growth of species to be controlled, when rainfall can be expected for soil activation. | (1) Pronone 10G — 5-30 lb/A. Soil texture determines rate. (2) 75% hexazinone (Velpar ULW) — 2.5 to 5.5 lb/A depending on soil texture. | Apply with aerial or ground equipment. |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|---|---|---|--|--|
| Selective herbaceous weed control in pine plantations | Grasses and broadleaf weeds, such as fescue, bahia-grass, golden-rod, dogfennel, broomsedge, etc. | Late winter to early spring before substantial growth occurs in spring. | (1) sulfometuron — 3-6 oz Oust per acre depending on weed complex. (2) sulfometuron plus imazapyr — 2 oz Oust plus 4 oz Arsenal per spray acre. (3) sulfometuron plus hexazinone — 2 oz Oust plus 2 to 3 pt Velpar L per acre. | Apply with ground or aerial sprayers delivering between 5-25 gallons per acre. Addition of Arsenal increases control of johnsongrass, bermudagrass, and other difficult species. Apply with ground or aerial sprayers at 5-25 gallons per acre |
| | | Mid- to late spring after growth of weeds has begun. | (1) sulfometuron plus glyphosate — 2-3 oz Oust plus 12-16 oz Accord SP per acre. | Apply in at least 10 gallons total solution. Addition of Roundup or Accord SP provides broad spectrum control of herbaceous weeds. |
| | | Early spring to midsummer. | imazapyr (Arsenal AC —Apply 4-10 oz per acre in 20-30 gal water. Add 0.25% v/v nonionic surfactant or less. | Best not to add surfactant for slash pine. Apply as a broadcast spray or as a 5- to 6-foot-wide band centered over pine rows. Labeled for loblolly, Virginia, and slash pine plantations. |
| | | Late spring to midsummer. | 1 oz Escort XP + 4-6 oz Arsenal in 10-30 gal water. Add .25% v/v nonionic surfactant or less. | Loblolly pine only. |
| DIFFICULT-TO-CONTROL WOODY PLANTS | | | | |
| Foliar spray | Easter Red Cedar | Summer. | Tordon K — .25% solution in 1% diesel: water emulsion. Tordon 101M — 32 oz + 4 oz nonionic surfactant in 5 gal water. | Spray to wet foliage. Spray to wet foliage. |
| Injection | | | Pathway — inject 3 to 4 ml for each 3 feet of tree height. | |
| Foliar Spray | Osage Orange | March-June. | metsulfuron methyl (Escort XP) — 1 to 2 oz per 100 gal water with 0.5% nonionic surfactant. | Apply as high volume foliar spray. Treat to runoff. |
| Basal bark | | | triclopyr (Garlon 4) — Use 13 oz Garlon 4 + 13 oz Cide-Kick II surfactant + 100 oz diesel fuel. | Apply to smooth bark on stems no larger than 3 inches in diameter. |
| Foliar Spray | Privet | May-Aug. | imazapyr (Arsenal AC) — Use a 1% v/v solution with 0.5% v/v nonionic surfactant in water. | Spray to wet foliage. May require retreatment if sprouting occurs. |
| | | May-Sept. | metsulfuron methyl (Escort XP) — 4 oz/100 gal water + 1% v/v nonionic surfactant | Spray to wet. May require retreatment if sprouting occurs. Can be tank mixed with Arsenal. |
| | | March - April | glyphosate (Accord SP) — 2 qt/A | Spray to wet. Provides excellent control (90 + %), but sprouting may occur. |
| Foliar Spray | Yaupon | May-June. | 6 qt Accord SP per acre + 2 qt Garlon 4 per acre | Spray to wet. |
| Foliar Spray | Switchcane or Bamboo | May-Sept. | glyphosate (Roundup or Accord SP) — 4 qt/A + 1% volume to volume nonionic surfactant. | Best results are obtained after burning or cutting patches and applying spray to sprouts. |
| | | Early spring | hexazinone — 8-10 qt/A— Velpar L | Sites should be dry at application time. |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|-------------------------|----------------------------|------------------|--|--|
| Injection | Chinese tallow | May-Feb. | triclopyr (Garlon 3A) Pathfinder II imazapyr (Arsenal AC) | Apply in dilutions and spacings specified on herbicide label. Nontarget plants may be killed or injured by root uptake of Arsenal. |
| Stumps | Chinese tallow | May-Feb. | triclopyr | Apply to stumps tops immediately after cutting. |
| Basal Bark | Chinese tallow | Before bud break | 20% v/v solution triclopyr (Garlon4) | Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark. |
| Seedlings and Saplings | Chinese tallow | Jul. – Oct. | 1% v/v solution imazapyr (Arsenal AC) 30% v/v solution Krenite S 2% v/v solution triclopyr Garlon 4 | Spray to wet foliage (add 0.5% nonionic surfactant to all mixtures). |
| Soil surface | Chinese tallow | Growing season | Velpar L | Apply one squirt with a spot gun per 1 inch stem diameter within 3 feet of the stem or in a grid pattern at spacings specified on the herbicide label. For treatment of extensive infestations in forest situations. Nontarget plants may be killed or injured by root uptake. |
| Injection and Stumps | Mimosa (silktree) | May-Feb. | triclopyr Garlon 3A imazapyr (Arsenal AC) | Make stem injection using herbicide dilutions as specified on herbicide label. For felled trees, apply these herbicides to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal. |
| Bark or Basal Bark | Mimosa (silktree) | Before bud break | 20% v/v solution triclopyr (Garlon 4) | Apply in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor) to young bark. |
| Seedlings and Resprouts | Mimosa (silktree) | Jul.-Oct. | 2% v/v solution triclopyr Garlon 3A or Garlon 4 2% v/v solution glyphosate 0.2-0.4% v/v solution Transline | Spray to wet foliage (add 0.5% nonionic surfactant to Garlon 3A and Garlon 4 mixtures). |
| Injection and Stump | Tree-of-Heaven (Ailanthus) | Mid summer | (Garlon 3A) Pathfinder II picloram + 2,4-D (Pathway) imazapyr (Arsenal AC) | Make stem injections in large trees then apply herbicide. For felled trees, apply herbicide to stem and stump tops immediately after cutting. Nontarget plants may be killed or injured by root uptake of Arsenal. |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|-----------------------|----------------------------|---------------|---------------------------------------|---|
| Basal Bark | Tree-of-Heaven (Ailanthus) | Midsummer. | 20% v/v solution triclopyr (Garlon 4) | Apply to young bark of saplings as basal spray in commercially available basal oil, diesel fuel, or kerosene (2.5 quarts per 3 gallons of mixture) with a penetrant (check with herbicide distributor). |
| | Tree-of-Heaven (Ailanthus) | July-Oct. | 1% v/v solution imazapyr (Arsenal AC) | Spray to wet all foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake. |
| | | | 30% v/v solution (Krenite S) | |
| | | | 2% v/v solution triclopyr (Garlon 4) | |
| Foliage spray | Baccharis | Midsummer | triclopyr (Garlon 4) | Spray to wet foliage of seedlings and small saplings. Nontarget plants may be killed or injured by root uptake. |
| Foliage spray | Palmetto | spring | 16 oz Garlon 4 + 4 g Escort XP | Spray to wet all foliage. Add 0.5% v/v nonionic surfactant to spray solution. May require sequential applications for complete control. |

WOODY VINES

| | | | | |
|------------------------------------|----------------------|---|---|--|
| Foliage Spray and Soil Application | Poison Ivy | Late spring application most effective. | (1) picloram + 2,4-D — Use 2-3 gal Tordon 101 or Grazon P+D mixture in 15-50 gal water. | Broadcast over root zone. Use picloram only where desirable trees with root zone in the treatment area are expendable. |
| | | Mid to late summer. | (2) 1-3 qt Garlon 4 or Remedy per 100 gal water. (1) 4-5 qt Accord SP or Roundup (glyphosate) per acre broadcast or 2% solution with hand sprayer. | Spray to wet foliage. Apply as foliar spray while leaves are green. Repeat applications may be necessary. Use the higher rate for plants that have reached woody stage of growth. |
| Foliar spray | Japanese Honeysuckle | Late spring and summer. | (1) 2,4-D (LV ester) — 4 lb/gal in 100 gal diesel. | Apply as a foliage spray thoroughly wetting all foliage and stems. Density will determine volume of spray per acre. Spot treat regrowth as required. Generally requires a follow up or second application. |
| | | | (2) glyphosate — wet all foliage with a 2% Roundup or Accord SP solution. | |
| | | | (3) 1-3 qt Garlon 4 or Remedy per 100 gal water. | Spray to wet foliage. |
| | | | (4) apply 1-2 oz Escort XP or Cimarron per acre in water solution. | Can damage black cherry or cottonwood. |
| Foliage spray and soil application | Wisteria | Aug.-Sept. | (1) picloram (Tordon K — 0.5 gal/A) (2) glyphosate (Accord SP — 8 qt/A) (3) dicamba (3% Banvel or Clarity) (4) metsulfuron (Escort XP or Cimarron — 1 oz/A) (5) clopyralid (Transline — 20 oz/A). | All treatments provided 90% brownout in first year — all to be reevaluated. (add 0.5% nonionic surfactant to all mixtures.) |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|---|-----------------|--|---|--|
| Foliar spray | Kudzu | Late spring to midsummer. | (1) picloram + 2,4-D — 1-2 gal Tordon 101 or Grazon P+D mixture in 20 gal water. (2) dicamba + 2,4-D — 3 lb dicamba + 5.5 lb of 2,4-D in 20 gal water. (3) Escort XP or Cimarron — 4 oz/A. (4) Transline — 21 oz/A. | Apply as foliage spray after full leaf expansion; repeat when regrowth appears. Will damage pines and hardwoods. Note: Use for pine vs. hardwood. Can apply over/under pine. Apply after full leaf. Use with 1 quart of nonionic surfactant per 100 gallons of water. Will damage black cherry, cottonwood, winged elm, dogwood, and some other hardwoods. Can apply over or under pines. Can apply around hardwoods but may injure leguminous species. |
| Foliar spray | Multiflora Rose | Spring. Summer. | (1) dicamba — Mix 1 gal Clarity or Vanquish in 100 gal water. (2) 2,4-D (LV ester) — 4 lb in 100 gal water. (3) 1-3 qt Garlon 4 or Remedy per 100 gal of water. (4) Escort XP or Cimarron — 0.75-1 oz per 100 gal water. (1) Accord SP or glyphosate (3 lb ae/gal) — 1% solution plus 0.5% nonionic surfactant. | Apply as a foliage spray after full leaf expansion; repeat when regrowth occurs. Addition of up to 5 gallons of diesel fuel per 100 gallons of spray will improve control. Spray to wet foliage. See Escort XP above. Spray to wet foliage. |
| Foliar spray | Trumpet creeper | Late summer. | (1) Accord SP or glyphosate (3 lb ae/gal) — 4 qt/A + 0.25% nonionic surfactant. | Apply at least 4 weeks before frost. May require re-treatment. |
| Foliar spray | Redvine | Late summer. | (1) Vanquish or Clarity - 2 qt/A | Apply at least 4 weeks before frost. May require re-treatment. |
| Foliar spray | Grape Vine | Late spring to midsummer. | (1) 2,4-D (LV ester) — 4 lb in 100 gal water. (2) 1-3 qt Garlon 4 or Remedy per 100 gal water. | Spray all foliage until wet. Addition of crop oil will improve control. Spray to wet foliage. |
| DIFFICULT-TO-CONTROL HERBACEOUS PLANTS | | | | |
| Foliar spray | Blue Vervain | Late spring to early summer. | (1) Triclopyr 32 oz Garlon 4 or Remedy 48 oz Garlon 3A (2) Grazon P+D (3) Weedmaster | Add 0.25% v/v nonionic surfactant. |

Woody Plants, Continued

| Application technique | Target species | When to apply | Herbicide and rate (active chemical) | How to apply |
|-----------------------|---|---|--|--|
| Foliar spray | Cogongrass (A combination of herbicide treatment following burning or mowing may be more effective than herbicide treatment alone.) | Mid to late summer. | (1) imazapyr — 48 oz/A or 1% solution of Arsenal or 24 oz/A or 0.5% solution of Arsenal AC with 1 qt nonionic surfactant per 100 gal spray. (2) glyphosate — 72 oz/A or 2% solution of 3 lb ae/gal formulation (with 0.5% v/v nonionic surfactant) if none in formulation. (3) imazapyr + glyphosate — 24 oz/A or 0.5% solution of Arsenal AC or 48 oz/A or 1% Arsenal plus 32 oz/A or 2% Accord SP or glyphosate (3 lb ae/gal) per acre with 0.25% v/v nonionic surfactant. | Apply in 20 gallons of spray per acre. Often requires treatment in consecutive years. Use 20 gallons of spray per acre. Apply mid-July to 2 weeks before killing frost. Apply in 20 gallons of spray per acre. |
| Foliar spray | Mistletoe | Winter. | Florel — 2 qt/A in 4 gal water + 0.25% nonionic surfactant. | Spray to wet foliage. |
| Foliar spray | Johnsongrass | Summer. | (1) Fusilade DX at 8-12 oz/A or 0.5% solution + 0.25% nonionic surfactant or 1% crop oil concentrate. (2) Select at 6-8 oz/A or 0.25% solution + 1% crop oil concentrate. (3) Outrider at 1.33 oz/A with 1 qt nonionic surfactant per 100 gal spray. (4) glyphosate (3 lb ae/gal) applied as 2% solution in fall. Add 1 qt nonionic surfactant per 100 gal if formulation has none. | Spray to wet foliage thoroughly, but not to point of runoff. Spray to wet foliage thoroughly, but not to point of runoff. |
| Foliar spray | Horetail or scouring rush | Summer. | (1) Telar — 1.3 oz/A. (2) Oust — 6-12 oz/A. (3) Rely — 3% solution. (4) Casoron — 150-200 lb/A of Carson 4G. (5) Hyvar XL— 6-12 gal/A. | Repeat applications will be required. Add 1 to 2 quarts of nonionic surfactant per 100 gallons of spray. |
| Foliar spray | Itchgrass | Summer-fall. Spring. Summer-fall. Summer-fall. | Glyphosate (Touchdown) 2% solution. Hexazinone (Velpar) 0.5-0.53 lb/A. MSMA 4 lb/A. Sethoxydim 1.5 % + 1% crop oil concentrate. | Spray itchgrass to wet all foliage. Be careful not to spray nontarget plants. Spray itchgrass to wet all seedling itchgrass foliage thoroughly. Add nonionic surfactant or oil concentrate. Spray itchgrass to wet all foliage. If surfactant is not present in the formulation, add nonionic surfactant at 0.25%. If the objective is to encourage bermudagrass growth, use MSMA alone. Spray itchgrass to wet all foliage but not to the point of runoff. |

The National Fire Protection Association (NFPA) 1144 Forms – 2002 and 2008 Editions

The 2002 Edition -

The National Fire Protection Association (NFPA) 1144, *Standards for Protection of Life and Property from Wildfire*, was developed following the tragic wildfires that resulted in the loss of 44 lives and 1400 homes in the United States in 1985. More recent wildland/urban interface fires, such as the 1991 conflagrations in Oakland, CA and the fires in Laguna Beach, CA (1993) and Malibu, CA (1996), have demonstrably shown that fire fighters are often placed in dangerous situations due to inadequate planning and design of roadways, signs, water supplies, and other infrastructure consideration as well as the increasing population of residential areas encroaching into wildland areas. The *Standards for Protection of Life and Property from Wildfire* has been adopted by state and local governments for use by numerous jurisdictions involved in planning Firewise Communities. This standard presents basic criteria for fire agencies, land use planners, architects, developers, and local government for planning development in areas that may be threatened by wildfire.¹

The 2008 Edition

The 2008 edition, now entitled *Standard for Reducing Structure Ignition Hazards from Wildland Fire*, focuses on individual structure hazards and excludes subdivision requirements that were incorporated in the 2008 edition of 1141, *Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas*. This edition also requires a new spatial approach to assessing and mitigating wildfire hazards around existing structures and includes improved ignition-resistant requirements for new constructions.

The NFPA 1144 presents basic criteria for fire agencies, land use planners, architects, developers, and local government for planning development in areas that might be threatened by wildfire. This standard, when used as part of a cooperative approach among key disciplines, will provide guidance in the design and development of Firewise Communities in or near wildland fire-prone areas. It is hoped that the requirements set forth in these forms will, first help protect the lives of both residents and fire fighters when wildfires strike and, second, reduce property damage.²

¹ National Fire Protection Association, , page 1144-1.

² National Fire Protection Association, NFPA 1144 Standards for Reducing Structure Ignition Hazards from Wildfire 2008 Edition, page 1144-1.



Wildland Fire Risk and Hazard Severity Assessment Form

Circle the most appropriate element in each category and total the points

Source: NFPA 1144 Standard for the Protection of Life & Property from Wildfire, 2002 edition, NFPA, Quincy, MA

| Element | Points | Element | Points |
|---|--------|---|--------|
| A. Means of Access | | D. Additional Rating Factors (rate all that apply) [Assign a rating factor between 1 (Low) and 5 (High)] | |
| 1. Ingress and egress | | 1. Topographical features that adversely affect wildland fire behavior. | _____ |
| a. Two or more roads in/out | 0 | 2. Areas with a history of higher fire occurrence than surrounding areas due to special situations, (e.g., heavy lightning, railroads, escaped debris burning, arson, malicious burning). | _____ |
| b. One road in/out | 7 | 3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds. | _____ |
| 2. Road width | | 4. Separation of adjacent structures that may contribute to fire spread. | _____ |
| a. ≥ 7.3 m (24 ft) | 0 | | |
| b. ≥ 6.1 m (20 ft) and < 7.3 m (24 ft) | 2 | | |
| c. < 6.1 m (20 ft) | 4 | | |
| 3. All Season Roads | | | |
| a. Surfaced road, grade $< 5\%$ | 0 | | |
| b. Surfaced road, grade $> 5\%$ | 2 | | |
| c. Non-surfaced road, grade $< 5\%$ | 2 | | |
| d. Non-surfaced road, grade $> 5\%$ | 5 | | |
| e. Other all-season | 7 | | |
| 4. Fire Service Access | | E. Roofing Assembly | |
| a. ≤ 91.4 m (300 feet) with turnaround | 0 | 1. Class A roof | 0 |
| b. > 91.4 m (300 feet) with turnaround | 2 | 2. Class B roof | 3 |
| c. < 91.4 m (300 feet) w/o turnaround | 4 | 3. Class C roof | 15 |
| d. ≥ 91.4 m (300 feet) w/o turnaround | 5 | 4. Non-rated | 25 |
| 5. Street Signs | | | |
| a. Present: 10.2 cm (4 in.) in size and reflectorized | 0 | F. Building Construction | |
| b. Not present | | 1. Materials (predominate) | |
| | | a. Noncombustible/fire resistive siding, eaves & decks | 0 |
| B. Vegetation (Fuel Models) | | b. Noncombustible/fire resistive siding, combustible deck | 5 |
| 1. Characteristics of predominate vegetation within 91.4m (300 feet) | | c. Combustible siding and deck | 10 |
| a. Light (Grasses, Forbs, Sawgrasses, Tundra, NFDRS Fuel Models A, C, L, N, S, & T. | 5 | 2. Building setback relative to slopes $> 30\%$ | |
| b. Medium (Light brush & small trees) NFDRS Fuel Models D, E, F, H, P, Q & U. | 10 | a. ≥ 9.1 m (30 ft) to slope | 1 |
| c. Heavy (Dense brush, timber & hardwood) NFDRS Fuel Models B, G & O. | 20 | b. < 9.1 m (30 ft) to slope | 5 |
| d. Slash (Timber harvesting residue) NFDRS Fuel Models J, K & L. | 25 | | |
| 2. Defensible Space | | G. Available Fire Protection | |
| a. More than 30.48m (100 ft) of vegetation treatment from the structure(s) | 1 | 1. Water Source | |
| b. 21.6 – 30.48m (71-100 ft) of vegetation treatment from the structure(s) | 3 | a. Pressurized water source availability | |
| c. 9.1 – 21.3m (30-70 ft) of vegetation treatment from the structure(s) | 10 | 1892.7 lpm (500 gpm) hydrants ≤ 304.8 m (1000 ft) apart | 0 |
| d. Less than 9.1m (30 ft) of vegetation of treatment from structure(s) | 25 | 946.4 lpm (250 gpm) hydrants ≤ 304.8 m (1000 ft) apart | 1 |
| | | b. Non-pressurized water source availability (off site) | |
| C. Topography within 91.4m (300 ft.) of structure(s) | | ≥ 946.4 lpm (250 gpm) continuous for 2 hours | 3 |
| 1. Slope $< 9\%$ | 1 | < 946.4 lpm (250 gpm) continuous for 2 hours | 5 |
| 2. Slope 10% to 20% | 4 | c. Water unavailable | 10 |
| 3. Slope 21% to 30% | 7 | | |
| 4. Slope 31% to 40% | 8 | 2. Organized Response Resources | |
| 5. Slope $> 40\%$ | 10 | a. Station ≤ 8 km (5 mi) from structure | 1 |
| | | b. Station > 8 km (5 mi) from structure | 3 |
| | | 3. Fixed Fire Protection | |
| | | a. NFPA 13, 13R, 13D sprinkle system | 0 |
| | | b. None | 5 |
| | | H. Placement of Gas and Electric Units | |
| | | 1. Both utilities underground | 0 |
| | | 2. One underground, one aboveground | 3 |
| | | 3. Both aboveground | 5 |

| Hazard Rating | Total Points |
|---------------|--------------|
| Low | < 40 |
| Moderate | 40 - 69 |
| High | 70 - 112 |
| Extreme | > 112 |

Home/Subdivision Total _____
Hazard Rating _____

STRUCTURE ASSESSMENT GUIDE

Date of assessment: _____ Property address: _____
 Resident: _____ Property Owner: _____

PRIMARY INFORMATION

| Assessment Items | Mitigation Recommendations |
|--|----------------------------|
| 1. OVERVIEW OF SURROUNDINGS | |
| How is the structure positioned in relationship to severe fire behavior? | |
| Type of construction: | |
| 2. CHIMNEY TO EAVES | |
| Inspect the roof – noncombustible? shingles missing? shingles flat with no gaps? | |
| Gutters – present? Noncombustible? | |
| Litter on roof, in gutters, and crevices? | |
| 3. TOP OF THE EXTERIOR WALL TO FOUNDATION | |
| Attic, eave, soffit vents, and crawl spaces: | |
| Inspect windows and screens – metal screens? Multi-paned windows? Picture windows facing vegetation? | |
| Walls and attachments – noncombustible? Will they collect litter? | |
| Decks – combustible materials? | |

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STRUCTURE ASSESSMENT GUIDE *(continued)*

| Assessment Items | Mitigation Recommendations |
|---|----------------------------|
| 3. TOP OF THE EXTERIOR WALL TO FOUNDATION <i>(continued)</i> | |

Fences.

Flammable material next to or under the structure.

Combustible materials near or on the structure where walls meet roof or decking surfaces.

Crawl space, attic vents, soffits.

Nooks and crannies and other small spaces.

| | |
|--|--|
| 4. FOUNDATION TO IMMEDIATE LANDSCAPE AREA | |
|--|--|

Landscaped (managed) vegetation – separation distances, maintenance, plant selection? Firewise Landscaping Zones?

Propane tanks.

Vehicle and RV use and parking, including lawn mowers, etc.

| | |
|---|--|
| 5. IMMEDIATE LANDSCAPED AREA TO EXTENT OF THE HOME IGNITION ZONE | |
|---|--|

Inspect vegetation clearance and crown separation.

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NFPA 1144 (p. 2 of 2)

| Rating Values by Areas Assessed | Overview of Surrounding Environment | From Chimney to Eaves | From Top of the Exterior Wall to Foundation | From Foundation to Immediate Landscaped Area | From Immediate Landscaped Area to Extent of Structure Ignition Zone |
|---|-------------------------------------|-----------------------|---|--|---|
| Topographical Features | | | | | |
| (1) Topographical features that adversely affect wildland fire behavior | 0 – 5 | | | | |
| (2) Areas with history of high fire occurrence | 0 – 5 | | | | |
| (3) Areas exposed to unusually severe fire weather and strong, dry winds | 0 – 5 | | | | |
| (4) Local weather conditions and prevailing winds | 0 – 5 | | | | |
| (5) Separation of structure on adjacent property that can contribute to fire spread/behavior | | | | 0 – 5 | 0 – 5 |
| Vegetation – Characteristics of predominant vegetation | | | | | |
| (1) Light (e.g., grasses, forbs, sawgrasses, and tundra) NFDRS Fuel Models A, C, L, N, S, and T | 5 | | | 15 | 5 |
| (2) Medium (e.g., light brush and small trees) NFDRS Fuel Models D, E, F, H, P, Q, and U | 10 | | | 20 | 5 |
| (3) Heavy (e.g., dense brush, timber, and hardwood) NFDRS Fuel Models B, G, and O | 15 | | | 25 | 15 |
| (4) Slash (e.g., timber harvesting residue) NFDRS Fuel Models J, K, and L | 15 | | | 30 | 20 |
| Topography | | | | | |
| (1) Slope 5 – 9% | | | | 1 | 1 |
| (2) Slope 10 – 20% | | | | 4 | 2 |
| (3) Slope 21 – 30% | | | | 7 | 3 |
| (4) Slope 31 – 40% | | | | 10 | 6 |
| (5) Slope >41% | | | | 15 | 10 |
| Building Setback , relative to slopes of 30% or more | | | | | |
| (1) ≥ 30 ft (9.14 m) to slope | 1 | | | | |
| (2) ≤ 30 ft (9.14 m) to slope | 5 | | | | |
| Roofing Materials and Assembly , nonrated | | 50* | | | |
| Ventilation Soffits , without metal mesh or screening | | 20 | | | |
| Gutters , combustible | | 5 | | | |

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* Nonrated and combustible roof assemblies are predominantly structural exposures and severely increase the ignition hazard from wildland fire.

Example of Structure Assessment Rating Form

| Rating Values by Areas Assessed | Overview of Surrounding Environment | From Chimney to Eaves | From Top of the Exterior Wall to Foundation | From Foundation to Immediate Landscaped Area | From Immediate Landscaped Area to Extent of Structure Ignition Zone |
|--|-------------------------------------|-----------------------|---|--|---|
| Building Construction (predominant) ¹ | | | | | |
| (1) Noncombustible/fire-resistant/ignition-resistant siding and deck | | | Low | | |
| (2) Noncombustible/fire-resistant/ignition-resistant siding and combustible deck | | | Medium | | |
| (3) Combustible siding and deck | | | High | | |
| Fences and Attachments, combustible | | | | 15 | |
| Placement of Gas and Electric Utilities | | | | | |
| (1) One underground, one aboveground | 3 | | | | |
| (2) Both aboveground | 5 | | | | |
| Fuel Modification with the structure ignition zone | | | | | |
| (1) 71 – 100 ft (21 - 30 m) of vegetation treatment from the structure(s) | | | | | 5 |
| (2) 30 – 70 ft (9 – 21 m) of vegetation treatment from the structure(s) | | | | 7 | |
| (3) <30 ft (9 m) of vegetation treatment from structure(s) | | | | 15 | |
| No Fixed Fire Protection (NFPA 13, 13R, 13D sprinkler system) | | | 5 | | |
| Totals (if number ranking is desired) | | | | | |
| Hazard Rating Scale (Compare with above totals) | | | | | |
| Slight Structure Ignition Hazards from Wildland Fire | 0 – 14 | 0 – 14 | 0 – 14 | 0 – 14 | 0 – 14 |
| Moderate Structure Ignition Hazards from Wildland Fire | 15 – 29 | 15 – 29 | 15 – 29 | 15 – 29 | 15 – 29 |
| Significant Structure Ignition Hazards from Wildland Fire | 30 – 49 | 30 – 49 | 30 – 49 | 30 – 49 | 30 – 49 |
| Severe Structure Ignition Hazards from Wildland Fire | 50+ | 50+ | 50+ | 50+ | 50+ |

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¹ The table provides both numerical and value rankings (low, medium, high). The user is urged to assign the value ranking of low, medium, or high based on the other ignition factors prevalent at the assessment site. For example, a deck made of combustible materials might rank low if it is small in size and the rest of the site is in a low fuel loading area that will not promote a large amount of firebrands. That same deck might rate high if it is in an area of high fuel loading that will promote numerous firebrands. Numeric values can be substituted as a local option.

Notes

[illegible]



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